P. André Sevigny

Trade and Navigation on the Chambly Canal
A Historical Overview

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P.-André Sévigny

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Cover: Towed by horses, two barges carrying pulpwood approach Saint-Jean, 1914. (Public Archives Canada.)

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Abstract

Perhaps more than any other waterway in North America, the Richelieu River evokes images of warfare. The river's history of more than two centuries of armed conflicts amply justifies such a reputation.

And yet for the often rival populations that became established at either end of the Richelieu-Hudson axis in colonial times, day-to-day life involved other pressing concerns and these, too, focussed on the waterway. For example, New France used the Richelieu to reach and exploit the exceptional forests surrounding Lake Champlain. And, after 1760, colonists in Vermont used the route both as a means of obtaining supplies and as a vital outlet for their natural resources, thus ushering in the era in which the Richelieu was to have a specifically commercial function.

It is not surprising that at this time traders at either end of what was formerly known as the River of the Iroquois began looking for means of improving navigation on the shipping route. Even before the end of the 18th century, proposals were made to canalize the Richelieu. The idea gained ground in Montreal, Burlington and Albany, but political and military developments of the day prevented it from coming to fruition, and after the War of 1812, political and financial imbroglios in Canada further delayed the realization of the project.

The dream was finally to become a reality in the middle of the 19th century, but by then the waterway improvements at Chambly and Saint-Ours were faced with challenges to their commercial function which were markedly different from those envisioned when they were originally conceived: the appearance of the railroad, competition from American canals, the increasing dimensions of barges and sailing ships, and the growing use of steamships in inland commercial navigation. It was thus that during the century following its opening, the Chambly Canal, given its outdated dimensions, managed only very partially to achieve the objectives its promoters had set for it. Increasingly, the much-desired link with the sea took on the appearance of a bottleneck between Sorel and New York.

While the improvements on the Richelieu, and especially the Chambly Canal, did not fulfil all expectations, they nevertheless succeeded, to the extent of their capacity, in furthering trade along this international artery. It was by way of the Chambly Canal that Canadian timber was shipped to the United States. Indeed, from about 1835 until the 1960s, the American demand for various wood products was the mainstay of the canal, for at least three-quarters of the tonnage shipped on it was related to forest resources. The main counterpart to the exported goods was coal from Pennsylvania, shipped to Canada via the Richelieu. While these major products of international trade came very early to be shipped by barge, exchanges of a more local or regional

nature relied primarily on sailing vessels. Although the latter constituted only a minor portion of the traffic on the canal, they were nevertheless active throughout its history.

In terms of both tonnage and the diversity of the goods shipped, commercial activity on the Chambly Canal reached its apogee around 1909. The two world wars and depression that were to follow dealt a heavy blow to international traffic on the Richelieu. The only way of averting this dramatic change would have been to make the entire Richelieu-Hudson system navigable to 12 feet, but since efforts to do so were unsuccessful, particularly on the Chambly Canal, all hopes of a revival were dashed and the fate of the canal as a trade route was sealed.

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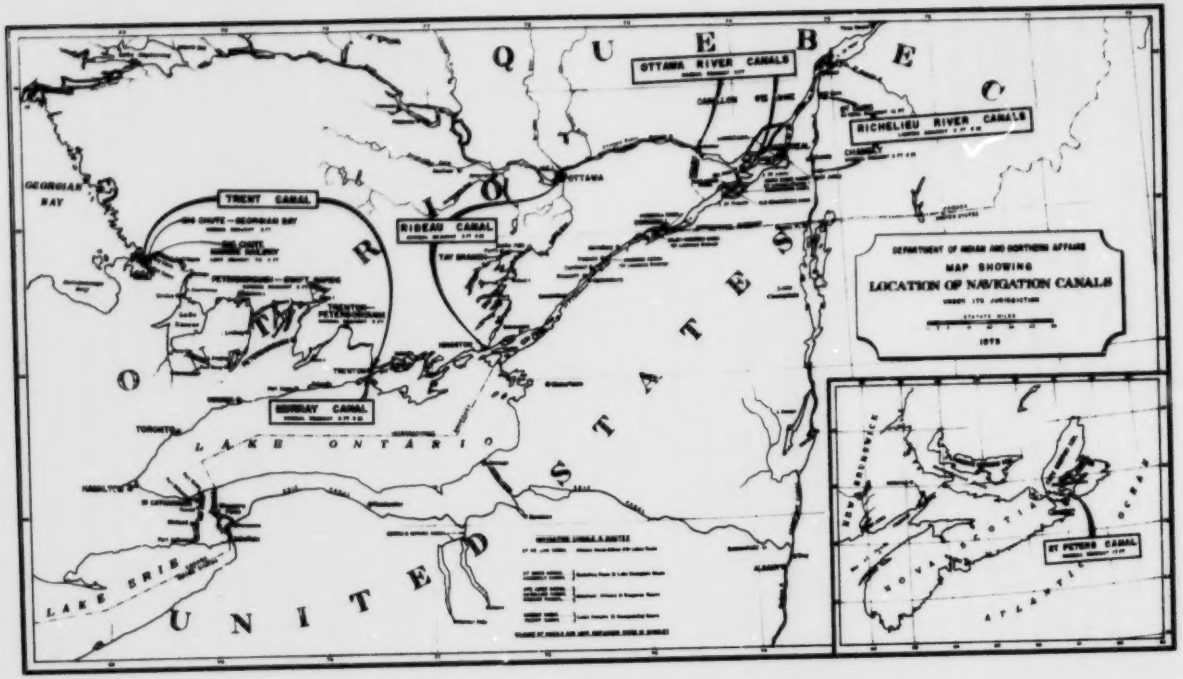
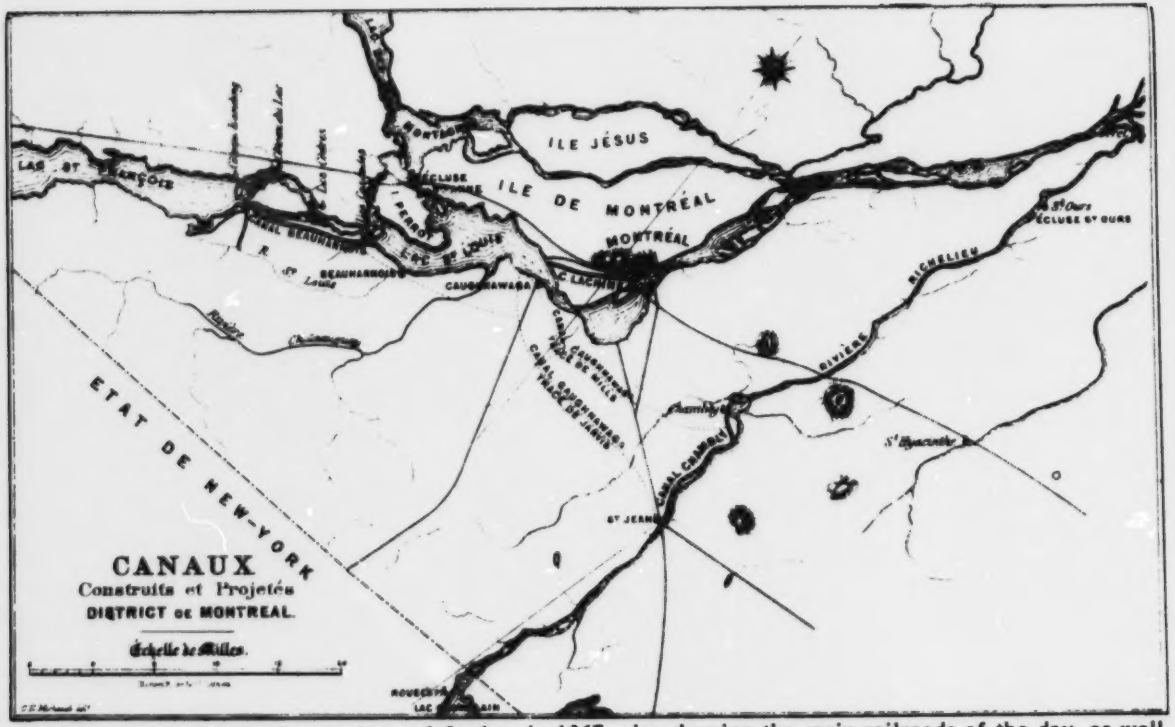


1 The canals of Canada and New York State, 1973.

Preface

The following study arises from more general research undertaken several years ago. The goal then was to recount the economic history of the Richelieu valley from the 17th century to the present. Such a vast time frame and the need to take on the whole question of Canadian-American relations necessitated limiting the scope of the work to an examination of the commercial history of the Richelieu beginning with its canalization in 1843. Finally, in order to respond to the pressing need for specific studies on the Chambly Canal, it was decided to focus the research primarily on the commercial use of this man-made waterway.

The study is not exhaustive and does not pretend to empty the vast field of research offered by the commercial history of the Richelieu waterway or indeed the Chambly Canal. Dealing with an international route means that the results of this inquiry can only be fragmentary. Many sources of historical records, both public and private, in Canada and the United States, remain unexplored, and others have been only partially tapped. Seen in this light, this research may be considered as an initial sounding, useful for tracing the dimensions of areas yet to be explored.



2 The canal system in the province of Quebec in 1867, also showing the main railroads of the day, as well as two routes still under consideration in 1867 for excavation of a Caughnawaga canal. (Canada. Department of Public Works, *General Report of the Commissioner of Public Works, for the Year Ending 30th June, 1867* [Ottawa: Hunter, Rose & Co., 1868], Map 5.)

Acknowledgements

In the course of the study, I was fortunate enough to be able to count on the collaboration of a number of persons. More specifically, I should like to draw attention to the documentary research contributed by two colleagues in the Historical Research Section of Parks Canada's Quebec Regional Office: Norman Lafrenière, who in 1974-75, in the framework of a study on the social history of the Chambly Canal, went through a number of newspapers, particularly from Saint-Jean, and made his file cards available to me, and Louise-Andrée Hardy, whose recordings of oral interviews conducted in 1975 with persons formerly associated with the operations of the Chambly Canal were of great use to me. I would like to take this occasion to thank them for their assistance.

3 The Chambly Canal. In addition to the canal's nine locks, the map shows the various bridges which span the waterway, as well as the railroad network in the area.

Introduction

Canalization is the ultimate remedy technology provides for possibly the worst misfortune that can befall a waterway: non-navigability. On a continent which was still relatively undeveloped, or which at any rate was being developed, there might be various reasons for canalizing a river. In Canada, particularly between 1775 and 1815, small canals were developed for primarily military purposes, such as transporting troops and supplies to strategic posts throughout the territory; however, at the same time such canals facilitated the settlement of outlying areas. The Coteau-du-Lac Canal clearly illustrates these priorities.

After 1815, with peace restored, the various settlements both in this country and the United States counted on exploitation of resources and trade in order to develop and prosper. Thus began the second phase of canal building. On the Richelieu, this activity was to serve the unambiguous purpose of facilitating trade.

How was it that this waterway, with its historical military role, came to acquire in the 19th century a resolutely commercial function? What were its commercial antecedents? What objectives did the promoters of the Chambly Canal set for it? To what extent did it facilitate trade? What were the various events - favourable or otherwise - that marked the canal's commercial history? These are the broad questions which this study of the commercial use of the Chambly Canal seeks to answer.

To achieve this, the study was divided into two parts. The first part recounts the use of the Richelieu prior to construction of the canal, from 1603 to 1843. Within it, three brief chapters break this period down: the first examines the French régime (1603-1763), the second deals with the development of trade under the British régime during the period of the Canadian-American wars (1763-1815), and the third, covering the years 1815 to 1843, describes commercial competition and canal construction on the Richelieu-Hudson axis.

The second part concerns the commercial use of the Chambly Canal from its opening in 1843 to the present. The users, their vessels and the goods they transported are the main subjects examined in order to ascertain the commercial role of the canal. The chapters are based on the types of vessels used, which has the not-inconsiderable advantage of illustrating the evolution of commercial navigation, in keeping with a chronological approach. Thus four chapters, dealing successively with rafts, sailing vessels, barges and steamboats, frame the historical information presented in this part. First, however, several pages are devoted to the structural evolution of the canal, as well as the changing patterns of trade and navigation throughout the period.

Part One
Use of the Richelieu River prior to the Construction of the Chambly Canal, 1603–1843

The potential of the Richelieu River as a communication route was evident to Europeans as early as the dawn of the 17th century. In 1603 Samuel de Champlain, in the course of his explorations, ascended the river as far as the present village of Saint-Ours, where rapids prevented him from going farther. There, amidst the warlike confrontations between the St. Lawrence Algonquins and the Iroquois nations, he was introduced to the history and geography of a vast region unknown to white men. He learned then that he was on the River of the Iroquois, and that the Iroquois, who had formerly been the masters of the St. Lawrence valley, had been pushed by the Algonquin tribes back to their own territory, in the present state of New York, in the course of a war that was said to have raged for several decades at that point.

He was also told of the existence of the Richelieu-Champlain-Hudson water route, by which the Iroquois of the Mohawk River continually returned to harrass the Algonquins living on the shores of Lake Saint-Pierre. Having chosen to side with the Algonquins, in 1609 Champlain took the war into the Iroquois territories and discovered Lake Champlain.[1]

Thus, until 1665-66, when the Iroquois territories were temporarily and partially pacified by the Carignan Regiment, the Richelieu was to remain a war route and consequently a no man's land. The use of the Richelieu as a route for colonization began in 1672, when Intendant Talon granted four seigneuries along the river: Sorel, Saint-Ours, Contrecoeur and Chambly. Prior to that, since 1665, French authorities had ensured the safety of this communication route by erecting forts at Sorel, Chambly, Saint-Thérèse and Saint-Jean, as well as on Ile Lamothe on Lake Champlain. The latter two forts proved to be too remote; they were abandoned in 1669 and the real boundary of New France was then set at Chambly, at the foot of the rapids.[2] These early attempts at settlement met with only limited success at least until 1713. For one thing, the fur trade held much more attraction for the young than the prospect of laboriously clearing land. In addition, after 1684, Iroquois raids once again rendered the entire valley unsafe, and the colonial wars broke out in 1689, setting the French of the St. Lawrence against the English of the Hudson. Because of its geographic situation, the Richelieu became a battleground.

The treaty signed at Utrecht in 1713 inaugurated an era of peace which was to last until 1744. During these 30 years, settlement of the lower Richelieu proceeded apace. Saint-Denis saw its first settler arrive in 1720. Four years later, several families settled at Saint-Antoine and in 1729 several colonists in the seigneury of Saint-Ours left the shores of the St. Lawrence to establish themselves along the Richelieu. At

Chambly itself, where there were only 18 families in 1724, there was a population of 450 in 1750. By this date the lower Richelieu, from Sorel to Chambly, could be said to be occupied.[3] On the upper Richelieu the same phenomenon did not begin until 1731 with the construction of Fort Saint-Fréderic at Pointe-à-la-Chevelure, at the southern end of Lake Champlain. As a result of this military presence, the frontier was suddenly extended more than 100 miles, and beginning in 1733 the intendant of New France, Hocquart, granted seigneuries in the newly protected territory. The seigneuries of Foucault, Noyal and Lacolle, farther south, were not colonized until 1741-42. Almost paradoxically, the growth of a military presence along the Richelieu led to settlement.[4]

More than ever, the opening of the upper Richelieu to settlement necessitated the development of adequate communication routes, and while a road system was certainly desirable, priority had to be given to improving navigation on the Richelieu itself. One reason for this was the need to transport men and supplies to Fort Saint-Frédéric. In 1742 a 45-ton boat was constructed to travel between Saint-Jean and Saint-Frédéric; the rapids prevented it from going farther downstream. These rapids, like those at Chambly, also considerably hindered the movement of settlers and their belongings to the new seigneuries on the upper Richelieu.[5]

During this period, moreover, the determination of the colonial authorities to make the Richelieu navigable along its entire length was reinforced by an industrial imperative. In 1731 a government-sponsored shipbuilding program had been launched at Quebec, one of its purposes being to stimulate private enterprise in this area.[6] In search of the types of wood required by this industry, particularly pine and oak, Hocquart ordered the inspection of the upper Richelieu, where these species - rare in the colony at the time - were said to be found in abundance. In 1734 the search conducted by the Sieur de Chévigny - he explored the banks of the Richelieu from Chambly to Lake Champlain - ended in failure.[7]

However, further explorations, conducted along the shores of Lake Champlain, were crowned with success. René-Nicolas Levasseur, head of shipbuilding at Quebec, set out in person in early 1745 and along the Saranac River he found the oak stands required. He described the trees as being of excellent quality, almost all of them suitable for making planks and beams. Furthermore, the red pine and cypress to be found in the area were of such high quality that "there is more than enough here to make masts for all the ships that may be built" [translation].[8]

A year earlier, Hocquart, in conferring the mission upon Levasseur, had assured him that he would have navigation on the river improved by "burning or mining" the boulders that obstructed passage.[9] Jacques Mathieu has studied timber harvesting in New France, and it is not without interest to read the description that he provides of the procedure for floating timber:

> In order to float timber on the rivers, it was necessary to form rafts in early spring, so as to

> take advantage of flood levels following the thaw.... When the break-up reopened the rivers, the workers constructed raft frames using logs of second quality, in accordance with French methods. The rafts they constructed were of two sizes, depending on the difficulties posed by the watercourse. A large raft measured forty to fifty feet long by fifteen to twenty feet wide and contained two layers of logs; a small raft was of lesser dimensions and contained only one layer of logs. Timber taken from the Lake Champlain region began its descent in small rafts; once past the Chambly rapids, it was reassembled into larger ones to be floated down to Quebec.... Difficulties arose, however, if the waters remained low thorughout the spring. On several occasions, the rafts foundered on the shoals. Then it took all of Levasseur's tenacity and experience to salvage them. [Translation.][10]

Until the end of the French régime, colonial authorities were to have their activities along the upper Richelieu and on Lake Champlain hindered by the rapids at Chambly and Sainte-Thérèse. On several occasions they tried to clear the course of the river at these points by dynamiting rocks, stumps and other obstacles.[11] Other solutions were also considered. Among them was the use of the road (or more accurately, the trail or track) linking Laprairie and Saint-Jean during the 1740s. This shortcut, however, was not very practical, and in September 1757, during the War of the Conquest, Bougainville gave up the idea of using it: "The road from Saint-Jean to la prairie," he wrote, "is now impassable. Until the marshes along it are drained, it will remain unusable" [translation].[12]

In 1758 the French troops moving toward Lake Champlain were once again obliged to circumvent the Chambly rapids; they portaged around them, assisted by local residents and their carts. Undoubtedly vexed by the obstacles to the movement of his forces, Montcalm in turn examined the possible remedies. He suggested that

> once peace is restored, it should be determined whether navigation could be facilitated by removing the boulders, [or] ... whether there should be a route from la Prairie to Saint-Jean going straight through the marshes or ... a route from Longueuil to Chambly and from there to Saint-Jean by land; or whether it would not be more advantageous ... to construct a canal from la Prairie or Longueuil to Saint-Jean. [Translation.][13]

New France fell before its leaders had an opportunity to finally reach a decision on one or another of these proposals. The canalization

of the Richelieu itself appears not to have been contemplated by the French régime, probably because of the chronic lack of funds, manpower and engineers qualified in this field. The imperatives of war, settlement and even industry were apparently insufficient to outweigh these constraints. Only the exigencies of trade were in time sufficient to give rise to the construction of a canal.

The British Régime: Trade and War, 1763-1815

Actual commercial use of the Richelieu began with the conquest of Canada by Britain. The numerous British merchants who settled in the Laurentian colony after 1763 were not long in appreciating the strategic importance of the waterway linking them to the American colonies. For all practical purposes, there was no longer any frontier between Canada and Lake Champlain, and this meant that they had the opportunity to draw on the vast natural resources to be found on the shores of the lake. Moreover, such commercial undertakings were facilitated by the migration of numerous colonists from Connecticut or New Hampshire to the area. With Ethan Allen and his brothers at their head, these settlers took over Vermont gratuitously, refusing to recognize any jurisdiction that New York or New Hampshire claimed over this territory.

Having thus become a sort of independent enclave, with its own government and justice system, Vermont promptly began logging its vast forests and established favourable trade relations with the St. Lawrence, its natural outlet. Until 1775, squared pine and oak, potash and barrel staves descended the Richelieu and were shipped to Quebec City, there to be exported to Great Britain. The wood was assembled in rafts some 16 feet wide and 40 feet long, to be floated to the St. Lawrence once the ice broke up on Lake Champlain.[1]

These promising beginnings were brusquely interrupted in 1775 when the American colonies declared war on Britain in order to gain their independence. While the Richelieu was thereafter the site of numerous confrontations between the opposing armies, it is not within the scope of this study to recount the events of this conflict. However, its political and commercial consequences were fundamental. While Vermont had espoused the cause of the rebel colonies, it maintained its desire to be recognized as an independent colony when the hostilities ended in 1777. Its political interests, and especially its trading interests, caused it to look primarily to Quebec City. In 1778 Vermont adopted a constitution and elected a governor, but the American Congress refused to recognize either. Ethan Allen then entered into negotiations with the Governor Haldimand, who was eager to separate Vermont from the American colonies.[2] These discussions were broken off in 1783 when the Treaty of Paris, which gave official recognition to the independence of the United States, placed Vermont within American borders.

Nevertheless, faced with the repeated refusal of the Congress to recognize their territory as a state within the union, the Allen brothers and their group once again began discussions with Britain. Aware that the St. Lawrence was still, despite the new borders, the natural outlet for their products, they wanted to negotiate free trade with Canada. It was in the course of these new negotiations that Silas Deane, a

representative of Vermont, proposed to Lord Dorchester in 1785 that a canal be constructed on the Richelieu so as to permit unimpeded navigation between the St. Lawrence and Lake Champlain. He put his proposal forward once again, in more concrete terms, in 1787.[3]

Finally, in March 1791, Vermont officially became an American state, but this did not mean that the canal proposals were to be dropped. That year, for example, Adam Lymburner suggested the construction of a six-mile canal, with three or four locks, from Sainte-Thérèse to the Chambly basin; it would be seven feet deep and 14 feet wide.[4] In 1796 Ira Allen of Vermont went to London and asked the British authorities to undertake canalization of the Richelieu.[5] He was insistent, since the political and economic developments of the past several years had pointed to the urgent need to undertake such a project.

The fact was that since 1794, the Jay-Grenville Treaty had enabled Americans and Canadians (whose country had since the Constitutional Act of 1791 been divided into two colonies, Upper and Lower Canada) to cross the border at will and to use the lakes, rivers and portages of both countries for trade purposes at no charge. Furthermore, in 1792 the Americans had established two companies whose purpose was to construct canals linking the Hudson River with both Lake Ontario and Lake Champlain. Despite these developments and notwithstanding the pressure exerted by the merchants of Quebec City and Montreal, the project to canalize the Richelieu was held up in long discussions in the Parliament of Lower Canada. The War of 1812 ended the debate.

From 1763 to 1815 the Richelieu was primarily used for transit trade. After the American War of Independence, the large lumber rafts from Vermont once again began travelling to Quebec City. Oak, pine, potash and barrel staves still made up the bulk of Vermont's exports to Canada and Great Britain. At the beginning of the 19th century, during the Napoleonic Wars, the timber trade between Lake Champlain and Britain increased considerably. After 1806 in particular, and until 1812, more than half of the oak and pine shipped from Quebec City to Britain came from Vermont.

In 1807 and again in 1809, American President Thomas Jefferson put an embargo on all foreign trade in response to the attitude of France and Great Britain toward neutral countries. However, the rafts from Vermont, manned mainly by French Canadians, forced their way through the customs barriers and went ahead with their lucrative trade.[6] Canada received these contraband goods[7] and in turn shipped sizable exports to Vermont, the great bulk of which consisted of furs, fish and salt.[8]

Concurrent to this international transit trade, a flourishing local trade developed along the shores of the Richelieu. Particularly after the turn of the 19th century, the major villages of Sorel, Saint-Ours, Saint-Denis, Chambly and Saint-Jean had markets that were open twice a week. Wheat accounted for the bulk of transactions and in several places large storehouses were located at the edge of the river to facilitate the loading of grain onto waiting boats that, for the most part, travelled to Quebec City, from where the wheat was to be exported.

Sailboats and other craft plied the Richelieu, stopping at the wharves that dotted the riverbanks. Some men traded in apples, purchasing them at Ile Lamothe, Lacolle, Iberville and Saint-Hilaire and selling them in the parishes of Lake Saint-Pierre.[9]

It was during this period that passenger transportation began to develop on the upper Richelieu. At the beginning of the 19th century, Americans from Vermont began operating small sailing vessels on Lake Champlain, some of which made connections with Saint-Jean in Lower Canada. Thus, in 1807 one could embark at Burlington and between ten and 24 hours later reach Saint-Jean, 75 miles away. From there a daily stagecoach would take the traveller to Laprairie, 18 miles away, in three hours. Finally, a ferry service linked Laprairie to Montreal; the nine-mile trip took two and a half hours.[10]

Not long afterward, in June 1809, the *Vermont* was launched at Burlington; it was the second steamboat in the world to offer regular commercial service. This paddle-wheeler, 125 feet in length and with a maximum speed of six miles per hour, was to shuttle between Whitehall, at the southern end of Lake Champlain, and Saint-Jean, with a stop at Burlington. Its owners had anticipated that it could make the round-trip journey in seven days, but in reality, it usually took some ten days. The career of this steamboat ended tragically in October 1815 when a mechanical breakdown caused it to founder on the Richelieu.[11]

Competition for Trade and the Proliferation of Canals, 1815-43

With the end of hostilities in 1815, Canada's military and business leaders found themselves in agreement that the improvement of inland waterways was to be given absolute priority. The former were now convinced that in the future it would be impossible to defend the country - Upper Canada in particular - unless this goal were achieved quickly, and the latter counted fully as much on these improvements to develop domestic markets and head off a trade invasion from the United States.

The fact was that since the beginning of the century, the Americans had not been content merely to send raw materials to Canada; increasingly they were tending to flood the Canadian market with manufactured goods, such as hats and shoes, as well as tobacco, sugar and tea. The problem of trade linkages was further aggravated in 1821, when the Hudson's Bay Company absorbed the North West Company, in the process wiping out the fur trade in the St. Lawrence valley. Fortunately, the lumber industry and a sizable trade in agricultural products offered the prospect of a considerable economic recovery, but these new economic bases would require improved transportation.[1]

In Upper Canada it was decided during this period to construct canals where necessary on the navigable waterways. This work was particularly urgent since the Americans were completing construction of the Erie Canal in New York State to link the port of New York and the Hudson River to Lake Erie; however, serious economic problems held up the implementation of the Canadian program. The Rideau Canal, as well as the Carillon, Chute-à-Blondeau and Grenville canals on the Ottawa River, were not inaugurated until 1834. The year before, the Welland Canal had commenced operations. On the St. Lawrence, the canal at Cornwall was completed in 1834. But the Erie Canal had been in operation since 1825 and its branch, the Oswego Canal, since 1828. The time lag was thus considerable. During this period, Lower Canada gave priority to the Lachine Canal, which came into service in 1824.[2]

The Richelieu was also facing fierce competition at this time. The situation became drastic when, in 1823, the Champlain Canal was opened. This new waterway, 66 miles long and 40 feet wide, linked the south of Lake Champlain to the Hudson River, Vermont thereby gaining access to New York and the vast market of the Hudson. Two years later, with the opening of the Erie Canal, it also obtained access to the Great Lakes. Overnight, trade between the St. Lawrence and Vermont, carried on via the Richelieu, dropped off drastically. Timber from Lake Champlain, for example, now began moving in the direction of New York in barges specially designed for inland navigation.[2] Until approximately

1835, shipping between Vermont and Canada was to be limited to strictly local trade.

In the face of this disastrous turn of events, it became imperative to make the St. Lawrence route attractive and profitable once more. Only the canalization of the Richelieu could achieve this, and, indeed, the merchants of Montreal and Quebec City had as early as 1815 urged the government of Lower Canada to undertake the project. They had renewed their demands in 1817, when excavation of the Champlain Canal had begun. It is not within the scope of this report to examine the actual construction of the Chambly Canal or the vicissitudes that marked the project until its completion in 1843;[4] the main phases of its development will be noted only briefly.

In 1818 the Parliament of Lower Canada authorized a private company to construct a canal at Chambly; the locks were to have a minimum width of 20 feet and be capable of accommodating vessels drawing five feet of water.[5] Serious financial difficulties delayed the beginning of construction and in 1823 work had not yet started. Finally, in 1827, the government of Lower Canada voted the funds necessary for the project and itself took charge of the operations. Commissioners were appointed in 1829, and the following year excavation began at Saint-Ours, 14 miles upstream from Sorel.[6]

Construction at Chambly itself began in October 1831, but soon afterward budget problems involving a dispute between the commissioners and their contractors led to a work stoppage. Despite the appointment of William Hopkins as chief engineer of the project in 1835, the work site remained deserted owing to new financial obstacles. The political unrest of 1837 further prolonged the paralysis and it was only after the union of the Canadas, in 1841, that decisive action opened the way for completion of the canal. At that time the Board of Works was established, and charged with completing the work. On 17 November 1843 the Chambly Canal was opened along its entire length, a distance of 12 miles punctuated with nine locks.

For Saint-Ours, the same board approved William Hopkins's proposal for a dam accompanied by a lock, but opted for another site. In September 1849 the Saint-Ours lock was opened. It was 200 feet long and 45 feet wide, with a depth of seven feet of water on the sills.[7]

It had taken more than 30 years to complete canal construction on the Richelieu. The significance of this long delay was heightened by the fact that since 1823 the American states of New York and Vermont, with the Erie and Champlain canals at their disposal, had resolutely oriented their trade toward the Hudson and the Great Lakes. Beset from the outset with serious financial problems and equally numerous political obstacles, the effort to improve navigation on the Richelieu had, since the end of the War of 1812, also been exposed to military objections. Above and beyond the political and commercial interests of its colony, London gave precedence to its concerns for territorial defence; and the construction of a canal on the Richelieu, at the very gates of the United States, was in its eyes tantamount to opening an invasion route in the

event of a renewal of hostilities. In 1826 and again in 1832 the British military authorities tried to block canal construction on the Richelieu.[8] Their efforts were ultimately unsuccessful, but they did manage to inflict additional delays on the project.

With such a belated arrival in the realm of commercial competition, it might seem that the Richelieu canal system would have little chance of recovering lost ground, particularly in view of the imposing network of canals south of the border. Considering as well that its opening was predated by the completion of the first railroad in Canada, which had provided service between Laprairie and Saint-Jean since 1836, its future might appear to have been most uncertain. Yet not all factors weighed against it. A half-century of unrestrained and irresponsible logging in the Adirondacks had resulted in the depletion of the great forests to the east and west of Lake Champlain. Thus in 1835 the timber trade underwent a drastic upheaval, and the roles were reversed. It was Canada, henceforth, that would supply the timber requirements of New York.[9]

Moreover, the Chambly Canal was already coming into use by this date. Even in the absence of the series of three locks to be constructed in the Chambly basin, and prior to the arrival of the lock keepers, it appears that the waterway was put into use by several sawmill owners situated in the vicinity of the canal. They felt that construction was sufficiently advanced for them to begin taking advantage of the turn-around of trade and to send planks and beams from their mills to Saint-Jean and from there to the United States. The following figures,[10] showing the value of timber exports passing through Saint-Jean, which at the time was the only port of entry between Lower Canada and the United States, clearly illustrate the rapid growth of this trade:

1834	£ 2 000	1837	£25 000
1835	£13 600	1838	£34 000
1836	£20 600	1839	£36 000

Between 1815 and 1843 the lower Richelieu water route, even though still handicapped by its passage through the Chambly rapids, saw an increase in local trade. As in the preceding period, grains were the main goods on which this economic activity was based, with wheat and peas predominating. Warehouses continued to proliferate along the banks of the river, as did adjacent stores to which local farmers came to obtain supplies in exchange for their cereals. Barges from Quebec City and Montreal ascended the Richelieu as far as Saint-Ours or Chambly, unloaded a variety of provisions, and returned laden with cereals and other farm products.

Soon these barges would be subject to competition from steamboats. As early as 1834, for example, three such vessels were competing for trade on the route between Montreal and Saint-Denis, making twice-weekly voyages; however, because of the shallowness of the channel, these boats were of modest proportions.[11] This was also the case with the steamer *De Salaberry*, which Chambly merchant Augustus Kuper put

in service in 1823 between Quebec City and Chambly. It docked at Saint-Mathias, Saint-Marc, Saint-Antoine and Saint-Ours.[12]

The communities of the upper Richelieu maintained similar trade relations among themselves; however, their products were mainly routed to Saint-Jean, from where they could be transported to various markets, Montreal in particular. The port of Saint-Jean, the fourth largest in Canada at the time, was also capable of exporting certain local products to the United States, owing to arrangements in effect between various merchants and American shipping firms. Since 1815 the Lake Champlain Steamboat Company had held a quasi-monopoly over trade on Lake Champlain. Its vessels, such as the *Phoenix*, the *Champlain*, the *Caldwell* and the *Congress*, crossed paths twice a week on their way between Whitehall and Saint-Jean. It cost passengers nine dollars to travel the distance between these two points.

A new company, the Champlain Transportation Company, took over after 1826, with larger and more powerful steamers such as the *Franklin* and the *Burlington*, which plied the same route.[13]

Part Two
Commercial Use of the Chambly Canal, 1843–1960

Since the goal of this report is to trace the commercial history of the Chambly Canal from the time of its opening in 1843 until 1960, it will attempt to shed light on the three major aspects of the canal's use: the users themselves, their modes of transport, and the goods they shipped.

First, however, both the structural evolution of the canal itself and the changing patterns of trade and shipping over this period will be summarized as succinctly as possible. The latter factor continually shaped the life of the canal. These background details will allow a better understanding of the commercial data that follow, and to a certain extent will eliminate the need for continually placing facts into context, as such a study would otherwise require.

The Chambly Canal and Changing Patterns of Trade

Officially opened to navigation in the spring of 1843, the Chambly Canal accommodated an 80-foot drop over its 12-mile length by means of nine locks whose average dimensions were approximately 120 feet in length and 24 feet in width. These locks were capable of accepting vessels drawing a maximum of six feet six inches of water. Designed during the 1820s and early 1830s, a canal featuring locks of this nature was well-suited to the modes of transport of the day, in particular the sailing barges that were towed along the canal by horses.

> Unfortunately, the class of vessel which began to see service on it bore little resemblance to those common when it was designed.... By mid-century, however, powerful paddle-wheel steamers were making their way up and down the inland waterways of the continent.[1]

These massive vessels were not long in inflicting serious damage to the masonry of the locks. By 1848, extensive repairs were necessary, but these were not to be completed until 1860 since, in the meantime, Canada's political leaders, at the request of the merchants of Montreal, were considering construction of a Caughnawaga canal to link the St. Lawrence to Lake Champlain by a land route. Various paths for the canal had been proposed, including one which would have made Saint-Jean its southern terminus. During the 1850s the project had been the object of numerous negotiations and studies which *ipso facto* relegated the pressing needs of the Chambly Canal to the shadows. The Caughnawaga canal never saw the light of day, but until the 1870s it constituted a veritable sword of Damocles suspended over the future of the Chambly Canal.[2]

Thus, when in 1869 the Minister of Public Works recommended new repair work and reconstruction of locks, the threat of a canal linking the St. Lawrence and Lake Champlain was still present. Therefore the locks on the Chambly Canal were kept to their already-outmoded dimensions and the repairs carried out were not of a permanent nature. Consequently, by the end of 1880 it was necessary to redo everything. From then until 1898, the locks were methodically reconstructed, giving them roughly the appearance that they have today, but still no thought was given to changing their dimensions. The canal underwent additional repairs during the 20th century, particularly before 1914 and between the two world wars.[3]

Hampered from the outset by an outmoded concept of commercial navigation and competing canal-building projects, the Chambly Canal and the trade conducted on it had the additional misfortune of facing fierce competition from railroads. While the canal was able to respond

adequately to the threat posed in its early days by the Laprairie - Saint-Jean rail link, provided since 1836 by the Champlain and St. Lawrence Railroad, it was not long in feeling the effects of extensions of the new transportation giant. In 1851 the Laprairie - Saint-Jean line was extended to the American border at Rouse's Point, where it promised to link with the American railroad network via the Rutland Railroad and the Vermont Central. This prompted several shipping companies operating on Lake Champlain to pull out of Saint-Jean and shift their northern terminus to Rouse's Point.[4]

The situation became even more serious when two years later, in 1853, Montreal was directly linked to Portland, Maine, on the Atlantic coast, via the St. Lawrence and Atlantic Railway. By this time the railroad had already proved itself and the engineer Thomas Keefer summarized the superiority of rail transport as speed, economy, regularity, safety and convenience.[5] These factors were undoubtedly taken into account by governments and business interests of the day; they were what gave rise to

> the Grand Trunk in the 1850s, the Intercolonial in the 1860s and the Canadian Pacific Railway in the 1870s. The National Policy of the federal government and the settlement policy of the Quebec government were leading, from the 1870s onward, to the completion of an infrastructure beneficial to industrialists and Montreal industrialists in particular. For Montreal was weaving a spider web; by the end of the century it was the terminus of the Grand Trunk, the Canadian Pacific, the Vermont Central and the Delaware and Hudson; it was directly linked to Halifax, Boston, New York, Chicago, Buffalo, etc. [Translation.][6]

Since the main economic function of the Chambly Canal had been to provide a trade link between the St. Lawrence, particularly Montreal, and the United States, it is obvious that in light of the development of the rail network, the canalization of the Richelieu had become obsolete. The port of Saint-Jean owed its prosperity primarily to trade between Montreal and Boston. It had experienced a manufacturing boom in the early 1850s, and its population at that time was approximately 4500. The Montreal-Portland rail link brought this boom to a halt and by the time of the 1871 census, the town had no more than 3000 inhabitants and its population was emigrating in great numbers to the United States.[7]

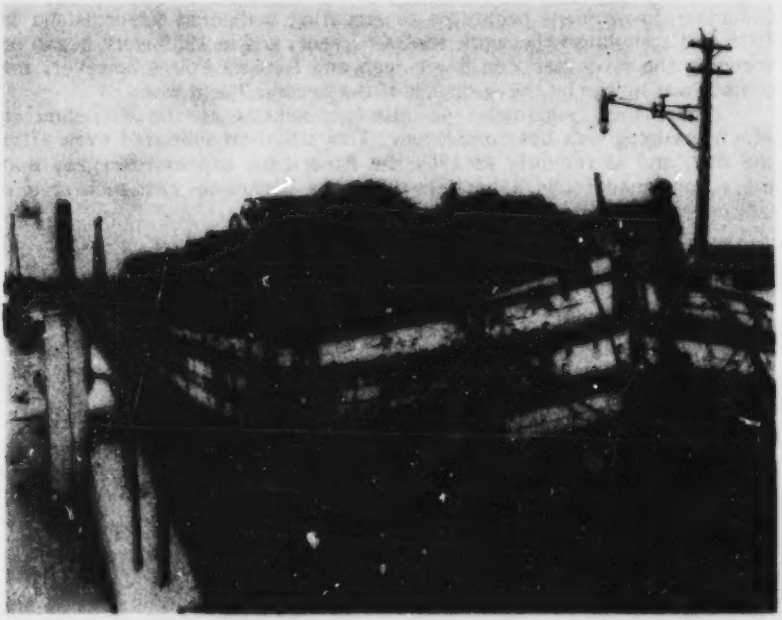
Despite this unfavourable turn of events, the Canadian government did not abandon the idea of exploiting more fully the commercial potential of the country's canals. A royal commission on canals was set up in 1870 to recommend necessary improvements. The following year, the commission members submitted their report:

> The wisest policy for Canada to follow, in regard to the line of water communication between the lumber yards of Ottawa and the great lumber

> markets at Troy and Albany in New York State, was to enlarge all the canals on the line of navigation from Ottawa to Lake Champlain to one uniform scale commensurate with that recommended for the Ottawa canals and with which the lock at St. Ours already corresponded. This recommendation, if allowed, necessarily involved the enlargement of the Chambly canal.[8]

It was therefore recommended that the Chambly Canal be provided with locks 200 feet long by 45 wide, with a depth of nine feet of water on the sills, but Parliament did not act on this report.

From 1870 to 1900, various proposals were put forward, both in Canada and the United States, for enlarging these countries' canal systems and making the Great Lakes accessible to ocean-going vessels. In 1895 an international commission was set up to study these various proposals, but in 1897 the U.S. Army Corps of Engineers declared its opposition to any undertaking of this sort. Rather, it recommended that



4 A barge carrying 115 cords of pulpwood, moving through the Chambly Canal locks in 1911. (Public Archives Canada.)

the canals in New York State be expanded to accommodate 1500-ton barges. The proposal was endorsed by the New York State government, and it was thus that in 1903 construction began on the New York Barge Canal System. This was to transform the Erie, Oswego and Champlain canals, enlarging the dimensions of their locks to lengths of 300 feet, widths of 45 feet, and depths of 12 feet on the sills. On 15 May 1918, the system was opened for navigation.[9]

Completion of this major project gave rise in this country to the ambition to improve the Canadian extension of this route in order to take maximum advantage of the great commercial benefits offered by the American section. The Canadian government therefore took action along these lines. Between 1928 and 1930 the Richelieu was deepened to 12 feet between Sorel and Saint-Ours, and in 1930 construction began on a new lock at Saint-Ours to be 339 feet long, 45 feet wide and 12 feet deep. It was completed in 1933.[10]

In 1936-37 an international joint commission was set up to examine the possibility of linking the port of Montreal to the Hudson River by a shipping canal via Lake Champlain. In the report, Canadian members of the commission stated that their country was willing to deepen the Richelieu River to 12 feet along its entire length. Accordingly, the Canadian government began by constructing a dam at Fryer Island in 1938 and completed the work the same year, and in 1939 work began on dredging the river between Saint-Jean and Rouse's Point; however, the project was halted by the outbreak of the Second World War.

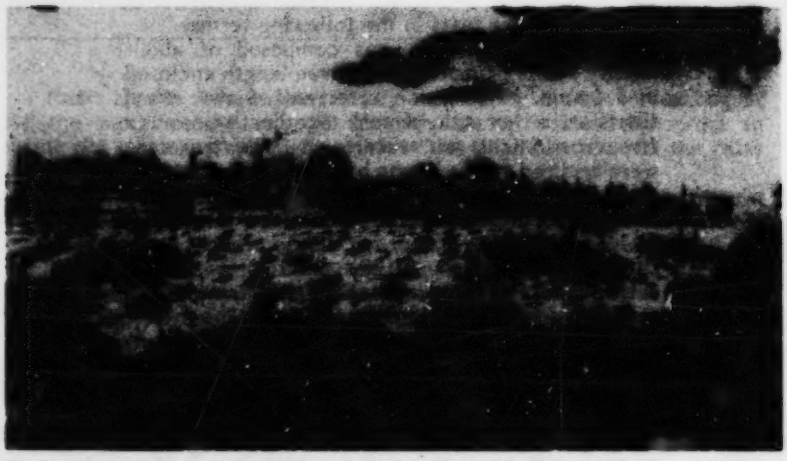
There thus remained a 66-mile-long section on the Richelieu on which dredging was not completed. This situation subsisted even after the war, and as recently as 1960 the Americans expressed regret that there continued to be a bottleneck on the Richelieu with such serious consequences for this great natural navigation route.[11]

Lumber Rafts

Canada's timber saga can never be dissociated in the popular imagination from its ancestral mode of transport, the raft. Like the timber drivers, the raftsmen (who came to be known to French Canadians as "rafsmans"), entered into legend and folklore. On the Richelieu itself, the use of log rafts began in the first half of the 18th century, when the French were harvesting timber from the shores of Lake Champlain. Having been assembled there on the lakeshore, their rafts were floated down, over the rapids of the "River of the Iroquois," toward the shipyards at Quebec.

After the Conquest, the trade was revived by Vermont; the destination and the mode of transport remained the same. If only for purposes of comparison, it is not without interest to describe the manner in which rafts were built during this period.

> The settlers and timber men built the rafts during the winter on the ice at the shore of the lake or the banks of a river or stream. They laid thirty to forty-foot pine or cedar logs beside each other and bound them together by pieces of smaller size well hunnelled down. Around this log platform



5 Lumber rafts on the Richelieu in the mid-19th century. Undated engraving by Bourne. (Public Archives Canada.)

> they raised a thirty-inch parapet and loaded it with staves and saw lumber. Clay was packed over the staves for a cooking hearth and other cargo was loaded on top of the staves. Occasionally a more elaborate raft would have a log cabin for its crew. When the ice melted and the raft floated free, the crew guided it into the current and down the lake and rivers with a long sweep oar, and in case of a favorable wind, set a crude sail. Sometimes several rafts were joined and floated together in a long line.[1]

Toward 1835 the timber trade was reversed and its promoters switched roles. The Canadians were henceforth to be the suppliers, and the Americans, the purchasers. This new scenario was to remain unchanged for more than a century, with the Ottawa playing the leading role and the Richelieu continuing to be the scene of the action. The trade reversal was greatly facilitated by the canalization of the Ottawa, completed in 1834 (with the exception of the Sainte-Anne lock, which was added to the system in 1843). From then on, the canals on the Ottawa, owing to their locks of some 126 feet in length and 32 feet in width, were able to accommodate barges towed by small steamboats, such as the *St. Andrew*, which inaugurated this waterway in April 1834.

However, these developments did not eliminate rafts from the timber trade on the Ottawa. Adapted to the dimensions of the locks, they continued for some time to make their way down to the St. Lawrence. The Ottawa River raft, known as a "crib," was much smaller than the "drams" that navigated between Lake Ontario and the port of Quebec on the St. Lawrence, but was similar in construction. Arthur Lower describes these river rafts in the following terms:

> An Ottawa River crib was composed of about twenty sticks of more or less even length enclosed in a frame. The frame consisted of two round floats on either side pinned together by four or five cross sticks or "traverses." The traverses were secured to the floats by birch pickets passed through auger holes. The sticks of timber lay between the floats and under the traverses. There was nothing except friction to prevent their sliding out endways, but the friction was made sufficient by hauling on top of the traverses a second tier of a few loading timbers. These sank the bottom layer a few inches and bound it against the traverses. The upright ends of the birch pickets were always left protruding. This was to hitch a plank over them with an auger hole in it and join the cribs into a raft. Along the sides of each crib were rowlocks in which long sweeps could be shipped.[2]

It was in 1843 that timber from the Ottawa River, assembled in such rafts, began passing through the Chambly Canal.

Even after 1849, the year in which the Saint-Ours lock was opened, Ottawa River log rafts were present on the Richelieu. In October 1852, for example, the superintendant of canals stated that the dredging of the Chambly Canal was being impeded by the large quantity of rafted timber passing through the canal.[3]

Statistics on the shipping of timber on the Chambly Canal during this period differentiate between the boats and the rafts involved in this activity. Table 1 shows the breakdown between these two modes of transportation; it clearly indicates that while planks, beams and other saw timber were almost exclusively carried by boat, square timber was primarily transported by means of rafts.[4]

Table 1. Quantity of Timber Transported on the Chambly Canal by Boat and by Raft, 1850, 1852 and 1854 (in tons)

Article	1850	1852	1854
Square timber by boat	-	50	92
Square timber by raft	1 762	38 185	17 119
Round or flat wood by boat	-	40	700
Round or flat wood by raft	10	1 220	72
Planks, beams, saw timber by boat	33 933	25 914	32 540
Planks, beams, saw timber by raft	84	926	537

Rafts appear to have been widely used during the 1860s. In August 1866 the superintendant of the Chambly Canal received the order to operate the locks day and night to clear the Chambly basin of the rafts that were accumulating there.[5]

The frenzied pace at which rafts were moved through the locks in this period resulted in work conflicts. At Saint-Ours, the overworked lock keepers

> have been in the habit of taking jobs from raftsmen to lock their timber for which they have been largely paid, and when parties refuse to treat with them, have placed every obstacle possible in the way, interfering with the prices paid by them for men and refusing to allow any timber to be locked except three men be furnished to work the lock. All this is contrary to Canal Regulations and law.[6]

The movement of lumber rafts through the Chambly Canal appears to have continued until approximately 1877. At least this is what was reported in 1943 by François Goyette, a former navigator from Iberville. His recollections of the log rafts provide highly interesting testimony on the subject:

> These cribs (large rafts or assemblages of floating logs) reached the United States by way of our river even before the existence of the Chambly Canal. As for myself, I recall that cribs 60 feet long and 20 feet wide were hauled up through the canal by horses. The cribs consisted of squared tree-lengths that were known as *placons*. These were arranged in two layers; the first, consisting of softwood (mainly pine), was intended to facilitate floating; the second consisted of hardwood (chiefly white oak). They were separated by traverses. It should be emphasized that these trunks were held together not by chains or cables but by birch branches fastened down by pegs.
>
> These cribs started out near Ottawa (Bytown), went down the St. Lawrence and were then pulled upstream on our river to St-Jean; they were joined together in groupings of 4 or 5, forming trains some 300 feet long. They were then towed to Burlington, where the wood was sawed by the Booth Lumber Co. The cribs were each usually navigated by 3 men, who occupied a cabin some 8 feet square. The best timber driver that I knew was Tom Boissonneault, who came from St-Jean. He was the one who assembled the cribs here and saw to it that they arrived safe and sound. After about 1877, there were no more of these log trains. That was when they started shipping pulpwood to the United States on barges. [Translation.][7]

The lumber rafts from the Ottawa had to be towed the entire distance along the Richelieu.

The largest timber entrepreneurs along the Ottawa operated with the greatest imaginable independence. At the head of veritable empires, these lumber barons maintained their own transportation organizations: rafts, barges, tugboats, and even railroads. This was the case, for example, with John R. Booth of Ottawa, the Hamiltons of Hawkesbury, and the MacLaren family in Buckingham. Of these, however, only Booth traded with both the United States and Great Britain. His rivals centred their trade exclusively on Quebec City, with a view to exportation to Britain. Booth, in addition to transporting his own wood, also operated his own sales agency in the United States, as well as a sawmill located in Burlington on Lake Champlain.[8]

Smaller logging companies for their part entrusted the shipping of their products to specialized firms. Among the latter, the most notorious were certainly Jones, Henderson & Hooker, the Ottawa River Navigation Company, and the Ottawa and Rideau Forwarding Company.[9] The last company was very active on the Richelieu, where its tugboats towed rafts or barges to Saint-Jean. In 1875 it even established its own wharf in Saint-Jean.[10] One of its main customers at that time was J.C. Pierce, who operated a wood-processing and shipping firm in Saint-Jean that traded with the United States.[11]

From Saint-Jean to Lake Champlain, the towing of rafts, as well as of barges, as shall be seen below, was largely in the hands of American shipping companies. During the period 1845-80, the main ones were the Champlain Transportation Company of Whitehall, the Merchants' Line of Burlington, and the Lake George Stamboat Company. In operation since 1826, the first was by far the largest. Over the years it acquired a quasi-monopoly over commercial navigation on Lake Champlain and the upper Richelieu. The Merchants' Line, in the face of competition from railroads in Vermont, ceased operations in 1853-54. The other rival, the Lake George Steamboat Company, was purchased outright by the Champlain Transportation Company in 1868, whereupon the latter company's monopoly became a *fait accompli*.[12]

Sailing Vessels

The world history of navigation is closely linked with that of the sail. Until the discovery and use of steam as motive power, sailing vessels enjoyed a serene and uninterrupted reign. In North America the first steamboats to be used successfully for commercial purposes appeared in the early years of the 19th century. Between 1807 and 1809 they made a sensational entry onto the shipping scene at New York, Burlington and Montreal. The history of their contribution to trade will be examined below; however, for the moment, it will suffice to mention that they did not initially represent a threat to the hegemony of sailing vessels. Indeed, it was not until the end of the 1820s that their numbers increased and they entered into commercial competition in force.

On secondary navigation routes, the steam revolution took longer to manifest itself, and between 1825 and 1845, Lake Champlain was still pioneer territory. The population was sparse and capital was rare. To be sure, the Winans brothers of Burlington had constructed and launched the *Vermont* in the summer of 1808. Like the other steamers that would later ply the lake, the *Vermont* was mainly destined for passenger transportation. Commercial navigation was thus the domain of sailing ships, and they handled trade between Whitehall and Saint-Jean.

During this period, "people told of the forest of masts to be seen on the lake harbors, while several sails could almost invariably be seen anywhere on the lake, any day during the navigation season."[1] Of course the *raison d'être* of these sailing vessels was trade, particularly trade with Canada:

> The Custom House records tell the story of the flourishing trade carried on with Canada by the sailing ships. Accounts of shipping firms from Whitehall to Rouse's Point, their weigh bills and invoices, show the increasing volume and variety of the cargoes these ships carried in and out of the Champlain Valley.[2]

Similarly, on the Richelieu of 1845, steamboats were relatively rare. The main companies using these vessels preferred to concentrate their operations on transporting passengers and valuable freight between major towns along the river. Such was the case with Montreal's St. Lawrence Steam Boat Company, dominated by the Molson family. This left the field of transportation between the many small villages along the St. Lawrence and the Richelieu open to the owners of sailing vessels:

> The volume of traffic was probably not sufficiently sizable or profitable for the steamboat companies; but it provided enough remuneration for owner-captains who did not operate their vessels

on any regular line and whose investment and costs were minimal. [Translation.][3]

This type of business, while not spectacular, was a prosperous one, and it attracted investments, particularly on the Richelieu, where French-Canadian merchants such as Joseph Masson maintained close trade ties with the villages along the Richelieu and the St. Lawrence.

Once the canal had been built, two main types of sailing ships were to be found on the Richelieu. First there was the sloop, a small vessel of some 50 to 100 tons, with a vertical mast. It was the boat most commonly operated by the small owner-captains on the Richelieu. It was ideally suited for river navigation as well as for transporting the goods carried by these navigators: grains, vegetables, apples, hay, sand, gravel, stone, cordwood and so forth. On these vessels, measuring some 60 feet in length by 16 feet in width, the captain was his own master. François Goyette's memories of navigation go back to the 1880s:

> Like most of the boatmen then operating in Iberville, my father transported cordwood purchased in Noyan and the vicinity to be resold in Saint-Jean and Iberville. My father also transported a lot of sand to Saint-Jean, after the great fire there, for reconstruction....
>
> At the age of 13 (1883), I began to learn the trade of a navigator; I quickly learned to manoeuvre. I soon developed a liking for this trade, which allowed us to be our own masters. My five brothers were all navigators as well. Each had his own sailing vessel, so that our family owned six sailing boats capable of transporting a total of 500 tons. I want to stress that it was we who had built them, right there in Iberville....
>
> With our family fleet, we were able to take on major shipping contracts, such as for supplying the sand, gravel and stone for the construction of the Chambly dam or the repair of the Saint-Ours lock. We brought these materials up from Lake Champlain.
>
> Autumn was the time for apples. To buy them we went to Ile Lamothe, Lacolle, Missisquoi Bay, and later Saint-Hilaire. We loaded our boats to the brim with two-gallon barrels of apples. Then we went to Sorel, Trois-Rivières, Nicolet, Louiseville, Batiscan, Berthier, etc. to sell them. Our arrival was announced from the steps of the church....
>
> Until about 1910, there were some thirty sailing boats used for trade which dropped anchor in our bay at Iberville....

> I went to buy farm products from growers upriver. I bought various grains, tobacco, vegetables, anything. If I could I paid in kind rather than money. In exchange for their products, the farmers took salt, flour, manufactured goods and so on. We stopped at many wharves where they came down to meet us. This trade took up my time throughout the navigation season, except when I had shipping contracts or especially during the apple season. [Translation.][4]

While the sloop was ideally suited to the needs of the small local farmers, the schooner, for its part, handled the trade of riverside merchants, on the Richelieu as well as the St. Lawrence. Schooners could be used for either trade or fishing. They usually had two masts and their capacity was approximately 100 to 150 barrels. Larger than sloops, the schooners were used to carry goods between the centres along the Richelieu and the major cities on the St. Lawrence: Montreal, Trois-Rivières and Quebec. They were often owned by merchants or businessmen, and they could carry almost anything - raw materials, manufactured goods, foodstuffs, etc. - depending on the merchant's line of business.

The sailing vessels were for the most part constructed by Richelieu Valley navigators. At Iberville, François Goyette built some 20 such vessels, both large and small:

> The wood required to construct our boats we purchased locally. We selected pine, cedar and oak in convenient lengths. The greatest part of the boat was made of pine; oak was used for the prow and the stern, as well as the *"boudins"* (upper contours); the ribs were made of cedar. For the masts we used spruce. We didn't need a blueprint; we knew our trade by heart. The sails we used were what were known as "working" or "lateen" (pointed) sails. Almost all the boats made here had only one mast; they were all sailing vessels. We made our sails ourselves. We bought the canvas in Saint-Jean or Montreal. We made the riggings ourselves. [Translation.][5]

How many sailing vessels were in service on the Richelieu during the second half of the 19th century? Did they all use the Chambly Canal? Unfortunately, statistics that would trace over time the use of sailing vessels on the Richelieu are missing; however, data are available for 1868. That year, the Grand Trunk Railway company proposed to construct a stationary bridge over the Richelieu at Beloeil, which would have made it necessary for numerous sailing vessels and steamboats in service on the river to be equipped with costly mechanisms for lowering and raising masts and smokestacks at will. John G. Sippell, superintendant of canals, was not in favour of the project:

> There are two companies trading between the St. Lawrence and Lake Champlain who have thirty-five sailing vessels with masts; and Captain St. Louis with other parties familiar with the trade over this route, state that they estimate the number of sailing vessels to be at least two hundred, the largest portion being owned by the persons sailing them who live on board and cannot afford to pay towage. They also state that the masts are too large to be raised and lowered, especially with the small crew, these masts ranging from sixty to ninety feet in height and from eighteen inches to two feet in diameter.
>
> The Collector of tolls at St. Ours gives a list of sailing vessels, amounting to forty-three that trade on the Richelieu River and do not pass through the Chambly Canal, and seventeen steamers that would have to lower their pipes.... The sailing vessels, usually sailed by the owner with his family, would ... be obliged to abandon this route should a fixed bridge be built. These vessels are annually increasing in number, which in all probability will continue for years.[6]

When asked to give his opinion on this matter, steamship captain J. Jones took the opportunity to touch on various aspects of sailing craft navigation.

> The sailing crafts navigating the Richelieu River are rigged with spars from 9 to 19 inches in diameter, and from 75 to over 100 feet in height. About all trade on lake Champlain, many of them to Quebec and some below Quebec. They are manned with a crew of 4 men each, including the Captain; many of these vessels are owned by the Captains of them, who in some instances, have all they possess invested in their craft and depend upon its earnings for a living....
>
> There are schooners that frequently trade on the Richelieu River which, if their spars were altered to pass under Beloeil Bridge, would be useless vessels for larger waters; they of course would be shut out of this route, for no one would think of spoiling them for the Lower St. Lawrence or other places for the sake of one or more trips in a season up and down the Richelieu.[7]

While it is known that about 200 sailing vessels were plying the Richelieu in 1868, it would be interesting to know their relative share of the total volume of commercial traffic passing through the Chambly Canal. The following table shows over time the respective percentages

of canal traffic represented by sailing vessels and steamships in the second half of the 19th century.[8]

Table 2. Use of the Chambly Canal by Sailing Vessels and Steamships, 1850-1903

Year	Passages		Percentage
1850	Sailing vessels	1999	84
	Steamships	449	16
1855	Sailing vessels	1895	81
	Steamships	452	19
1860	Sailing vessels	3025	91
	Steamships	202	9
1865	Sailing vessels	4265	95
	Steamships	218	5
1871	Sailing vessels	3314	86
	Steamships	555	14
1890	Sailing vessels	1593	79
	Steamships	425	21
1903	Sailing vessels	3081	89
	Steamships	364	11

It is clear that sailing vessels predominated during this period; they were the primary users of the Chambly Canal. However, two points should be noted. First, a certain number of barges equipped with sails were counted as sailing vessels. Second, many steamships were too large to enter the locks on the canal and therefore do not appear in these statistics even though, stopping at Chambly or Saint-Jean, they contributed enormously to the commercial activity of the river and the canal. These two points will be discussed in the sections on barges and steamships.

How did the sailing vessels using the canal break down by category? Table 3, drawn from the general report of the commissioner of Public Works for the year 1867, distinguishes three categories of sailing vessels: 80 tons and under, 80 to 150 tons, and 150 to 200 tons.[9] As a general rule, the first category is associated with sloops, the second with ordinary schooners, and the third with large schooners. Table 4 shows the percentage distribution of sailing vessels in each of these categories.

Table 3. Number and Tonnage of Vessels Passing through the Chambly Canal, 1859-66

Year.	Vessels.	Upward bound Vessels, &c.					Downward bound Vessels, &c.					Totals up and down.		Aggregate amount of Tolls collected.
		80 Tons and under.	From 80 to 150 Tons.	From 150 to 250.	Totals.		80 Tons & under.	From 80 to 150 Tons.	From 150 to 250	Totals.				
					No. of Vessels.	Freight, Tons.				No. of Vessels.	Freight, Tons.	No. of Vessels.	Freight, Tons.	
														$ cts.
1859	Steamers	91	.....	...	91	.....	91	.....	...	91	.....	182	.....	.....
"	Sailing Vessels	905	368	4	1,277	123,108	898	353	6	1,255	30,871	2,532	153,979	14,922 82
1860	Steamers	101	.....	...	101	.....	101	.....	...	101	35,497	202	.....	.....
"	Sailing Vessels	1,049	447	5	1,501	158,499½	1,115	411	8	1,534	.....	3,035	193,997½	17,537 20
1861	Steamers	38	.....	...	38	.....	41	.....	...	41	.....	79	.....	.....
"	Sailing Vessels	654	128	...	812	70,577½	729	149	...	877	35,800	1,689	106,177½	9,491 33
1862	Steamers	49	.....	...	49	50,146½	53	.....	...	53	.....	102	.....	.....
"	Sailing Vessels	780	272	...	1,052	.....	827	209	11	1,047	28,722	2,099	78 868½	11,914 50
1863	Steamers	83	.....	...	83	.....	89	.....	...	89	.....	172	.....	.....
"	Sailing Vessels	1,114	437	30	1,581	253,817	930	578	26	1,534	29,037	3,115	282,854	23,643 30
1864	Steamers	69	.....	...	69	.....	71	.....	...	71	.....	140	.....	.....
"	Sailing Vessels	837	525	75	1,437	161,024½	897	524	78	1,499	36,236½	2,936	197,261	21,454 10
1865	Steamers	111	.....	...	111	.....	107	.....	...	107	.....	218	.....	.....
"	Sailing Vessels	1,256	869	73	2,198	303,266½	1,113	882	72	2,067	26,297½	4,265	329,824	27,496 21
1866	Steamers	136	.....	...	136	.....	135	.....	...	135	.....	271	.....	.....
"	Sailing Vessels	956	1,045	80	2,111	235,559	1,099	1,069	67	2,135	47,712	4,247	283,271	31,191 25

Table 4. Sailing Vessels on the Chambly Canal: Passages by Category, 1859-66

Year	80 Tons and Under	80 to 150 Tons	150 to 250 Tons
1859	71%	28%	1%
1860	71%	28%	1%
1861	84%	16%	0%
1862	77%	23%	0%
1863	66%	33%	1%
1864	59%	36%	5%
1865	56%	41%	3%
1866	46%	50%	4%

The small sloop, very popular and widespread until 1862, began losing ground in 1863, and in 1866 was overtaken by a larger type of vessel which was probably better suited to commercial use. Were these larger vessels schooners or merely modified sloops? The available information does not answer this question. Vessels in the highest category, those with capacities of 150 tons or more, used the canal very infrequently, at least during this period.

The year 1914 marked the end of the era of sailing vessels on the Richelieu and the Chambly Canal. Following the example of canals in New York State, the Chambly Canal was soon to become primarily a barge canal. Small local sailing vessels continued to ply the Richelieu until about 1945, but apparently they dealt solely in the apple trade along the river.

Barges

Of all the types of vessels that passed through the Chambly Canal, the barge was definitely the most prevalent. This is not surprising since the barge was particularly well-suited to canal navigation owing to its capacity to carry high tonnage of various types of merchandise.

Designed and built in the 1820s and 1830s, most Canadian canals had been equipped with locks designed to permit passage of the craft and vessels then in use. But no sooner had these locks been completed than they were already unsuitable for the large, heavy vessels that were beginning to account for the greatest share of the trade. Merchants and shippers promptly decided to begin using barges whose dimensions were perfectly suited to the locks. Such barges appeared on the Ottawa in 1834, as soon as the river was canalized. The region's lumber barons, such as John Booth, as well as the lumber-shipping companies, soon had numerous barges at their disposal.

To the south, the American canals were coping with the same problem. Opened in 1823 and 1825 respectively, the locks on the

6 A barge with a cargo of pulpwood en route through the canal in 1911; it is passing through the lower of the three locks in the Chambly basin. (Public Archives Canada.)

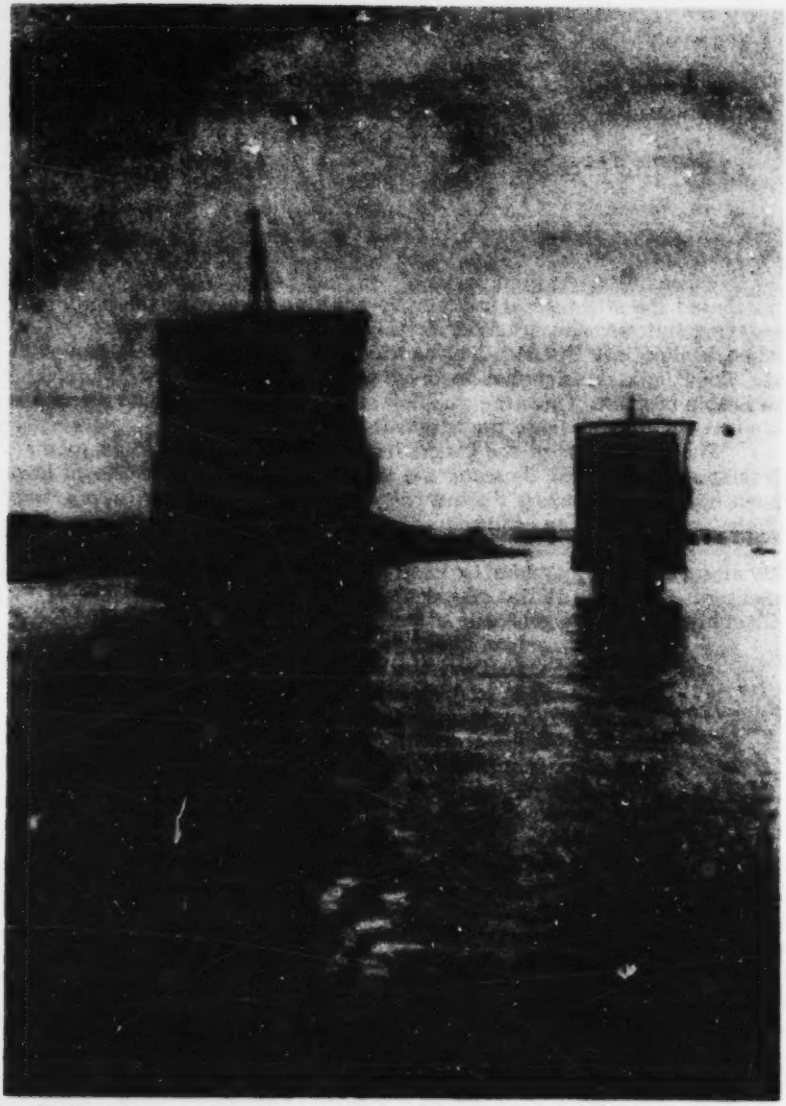
Champlain and Erie canals were bottlenecks that considerably impeded commercial navigation. Streamlined barges were very quickly brought into service. On Lake Champlain itself, the merchants had also decided to use them, having been won over by the ease with which the barges were loaded, as well as their high tonnage. For the lake trade, they had equipped their barges with sails, in the manner of the sloops. Between 1823 and 1833 there were no fewer than 232 sailing barges on the lake, and this number doubled in the decade that followed.[1]

However, when these vessels arrived at the entrance to the Champlain Canal at Whitehall, their cargo had to be transferred to the towing barges used on the canal, since their sails prevented them from travelling on this waterway. This resulted in long delays in delivery, which had particularly serious consequences for dairy products and other perishable goods. This situation lasted until 1841, when a Burlington merchant named Timothy Follett and an associate named Bradley launched the Merchants' Line shipping company. Their barges had sails too, but the sails and masts were detachable. When these barges reached Whitehall, their rigging was stored there and they were then towed by mules to Albany or New York. This system enabled shippers to save three or four days.[2]

Even though the Chambly Canal opened in 1843, it was not until 1849 that the heavier barges were able to move without interruption between the Ottawa and Hudson rivers. The sizable lumber trade on this route had been waiting for 15 years for completion of the canalization of the Richelieu, which came to pass with the opening of the Saint-Ours lock. As noted earlier, the value of Canadian lumber exports as recorded at Saint-Jean had risen from 2000 pounds in 1834 to nearly 40 000 pounds in the early 1840s.[3] Thus the opening of the Canadian section of the water route promised to result in even more rapid growth of this international trade.

Until 1850, apart from rafts, only light barges equipped with sails were able to ascend the Richelieu. During the winter of 1844-45, 28 such barges were emprisoned in the ice on the Chambly Canal. They had capacities ranging from 125 to 200 tons and were described as being "rigged as schooners and fitted up for canal, river and lake navigation."[4] In the early years of the 20th century, these sailing barges were still to be found on the Richelieu. By then they were being used exclusively for transporting pulpwood and lumber to the United States.

Mid-century saw the appearance of another type of barge - the type towed along the entire route by a schooner or steamboat. This form of transport was to gain ascendancy very quickly and was to characterize the commercial use of the Chambly Canal for the next century. The proliferation of barges and the lucrative traffic associated with them quickly led a number of navigation companies other than those specializing in this type of transport to acquire barges in order to reap the benefits of the commercial boom. In the 1850s this was particularly the case with firms operating steamboats. Such firms at that time sought



7 Sailing barges on the Richelieu River, circa 1900-05. (Marcel Gauthier Collection, Iberville, Quebec.)

every means available of making their operations profitable in the face of extremely vigorous competition.

The Compagnie du Richelieu, for example, whose main shareholder was Jacques-Félix Sincennes, had been organized in 1845. In the face of stiff competition on the St. Lawrence, particularly from the Molson and Torrance lines, it had early focussed on trade on the Richelieu. To its initial function, transporting passengers and first-class freight between Montreal and the Richelieu River, it soon added a second one, towing. In 1850 the company assigned a steamboat exclusively to towing lumber rafts and barges to the United States.

The same year, Sincennes pushed the experiment a step further. With William McNaughton, a merchant and sailor from Saint-Ours, he purchased the steamship *Lord Stanley* and five barges for the purpose of carrying Bytown sawed lumber to Whitehall. During the same period, when timber left Quebec City and Trois-Rivières for Lake Champlain, the Compagnie du Richelieu involved itself even further in shipping this desirable product. Once the shipping contracts were signed, it spent vast amounts in order to lease the barges it required.[5]

The dimensions of the barges had been studied so as to adapt them insofar as possible to those of the locks. In theory, there should have been no problem moving them through the canals; however, in practice, there were numerous collisions. More often than not, these were occasioned by the cargo rather than the vessels themselves, and the canal superintendants had to keep close watch and even take strong measures. In 1852 it was noted that the barges using the locks of the Chambly Canal were generally of acceptable dimensions, but

> in order to load them down, the boatmen are in the habit of allowing the deck load, when of sawed lumber, to project over the sides, sometimes to the extent of four feet, the hulls of the boats consequently do not come in contact with the masonry of the lock or bridges but the overhanging deck load strikes the gates of the locks and wood work of the bridge causing serious damage.[6]

Unfortunately, no documents could be found describing the various types of barges used on the Chambly Canal over the years, particularly in the 19th century. After 1890-1900, photographs partially make up for this lack. At any rate, it appears that until about the middle of the 1860s, barges, like other vessels, had rounded bottoms which fit fairly well the contours of the locks. Thus shaped, barges of this type with draughts of six feet six inches could move easily through the canal, provided that they were not overloaded.

Toward 1865, however, the square-bottomed barge made its appearance. While more spacious, the square bottom was also more likely to strike the lock walls, particularly at the base, where the locks were rounded. Canal authorities quickly restricted the draught of these barges to six feet and ordered that they not be overloaded.[7] Neverthe-

8 The moulded bow of a barge, front and side views. Barges thus constructed were less likely to damage the walls of the locks and the sides of the canal. (Frank H. Godfrey, *The Godfrey Letters....* [Syracuse: The Canal Society of New York State, 1973], p. 17.)

less, the use of this type of barge continued to grow in the following years and despite surveillance, these vessels frequently damaged the locks as well as the inside slope of the canal, next to the towpath. In 1882 the chief engineer for canals deplored this situation:

> A number of barges have been built for use on this route, of the full size of the locks. They are flat bottomed, with sides nearly vertical, and are but slightly rounded at the angles at each end. They are generally heavily loaded and are very apt to touch and scrape along the slope of the canal next the towing path without injury to themselves, as they are very strongly built, but at the same time might very easily detach stones which would find their way to the bottom. Rafts, being also flat bottomed with square ends, have a similar tendency to disturb the slopes.[8]

In the United States, on the Erie and Champlain canals, the same problems had arisen. Between 1825 and 1845 the barges using these canals had had square prows which, on colliding with the walls of the locks, often detached stones. In 1846 the American authorities ordered that thereafter, barges and other vessels navigating on these canals had to be equipped with semicircular prows, rounded at the bottom.[9] There is no doubt that this type of barge was adopted in Canada, probably during the 19th century, for the oldest photographs of barges on the Chambly Canal show such vessels. Moreover, this shape was to remain more or less unchanged in the 20th century.

Perhaps more than any other type of craft, the barge depended on towing in order to be carried over the 12 miles of the Chambly Canal. Harnessed in pairs, the horses on the towpath slowly pulled these heavy

barges along and saw them through the locks. It took them ten to 12 hours to tow the barges from Chambly to Saint-Jean. In about 1855, when it was decided to form barge trains by linking a number of the vessels together, serious bottlenecks developed at Chambly and Saint-Jean. Consequently, shippers and navigators complained of the slowness of operations on the canal. Superintendent Sippell gave the following account of this situation:

> Several of the parties who navigate the Chambly Canal with propellers and barges complain of being obliged to have all their barges towed through the canal with horses. I am of the opinion that propellers should be restricted to four barges, with direction to move slow and not injure the banks.[10]

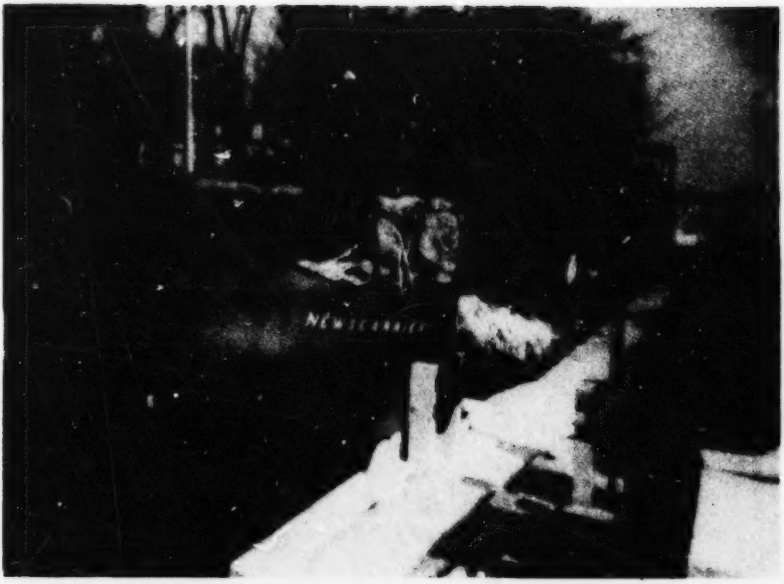
The few steamboats that were small enough to use the canal thus obtained permission to tow a maximum of four barges. This practice did not become widespread, since steamboats capable of passing through the locks were becoming increasingly rare. Therefore the use of tow horses on the canal continued into the 1930s and even beyond.

Following the First World War, the first motorized barges were put into service. At the time they were called "self-propelled barges" or "gasoline barges." In Saint-Jean they received attention in the press:

> The proposal to put a number of self-propelled barges into service between New York and Saint-Jean for transporting freight is being referred to as a *fait accompli*. These barges, which would provide rapid service and eliminate the congestion associated with the use of tugboats, could carry the equivalent of 10 to 12 boxcars of merchandise. [Translation.][11]

In September 1919 the gasoline-powered barges, operated by the Lincoln Steamship Company, arrived at Saint-Jean,[12] but were too large to use the Chambly Canal. It was not until 1934 that the *Donpaco*, belonging to the Donnacona Paper Company, entered the canal locks; it was headed for New York with a cargo of 200 tons of newsprint. Since they did not have to be towed, the motorized barges required only six hours to pass through the nine locks in the Chambly Canal - less than half the time required for conventional barges - however, this speed was entirely relative for the same motorized barges could cover the 63 miles of the Champlain Canal, with its 20 locks, in only 13 hours.[13]

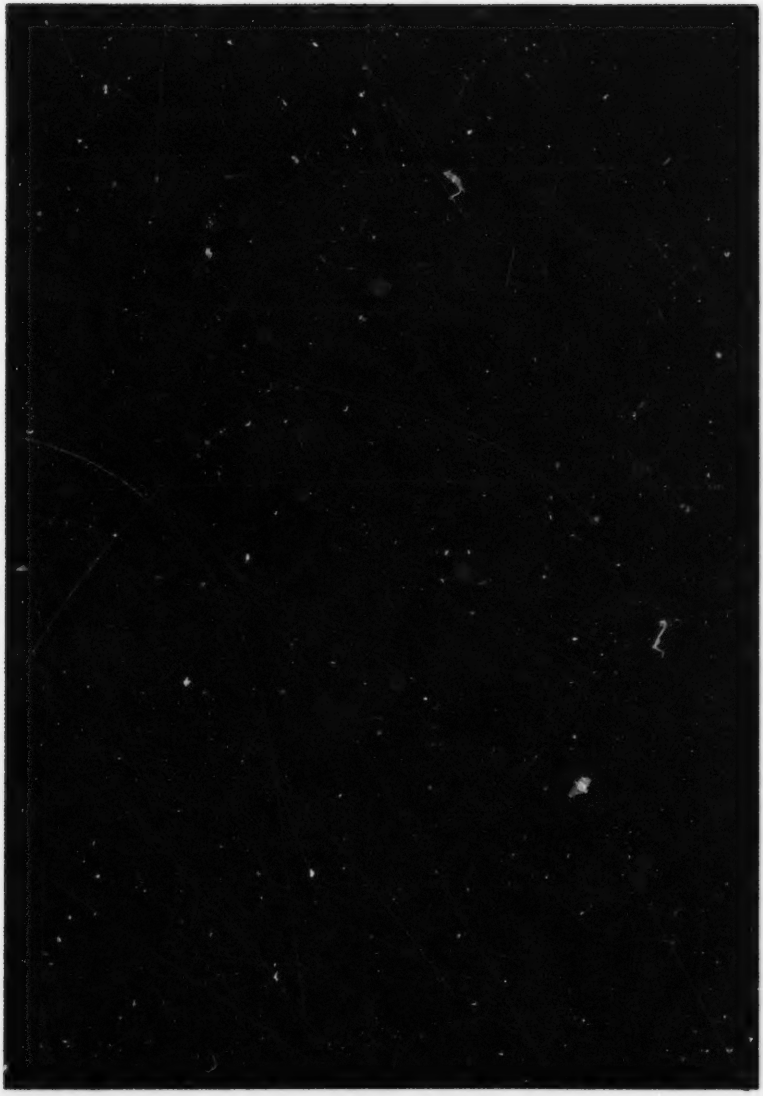
This speed of operation had characterized American canals from 1918, when the State of New York opened its barge-canal system for navigation. The fact was that since 1903, major construction work had been transforming the Champlain, Erie and Oswego canals. Now, with locks 300 feet long, 45 feet wide and 12 feet deep, these canals had acquired a new and unique function: facilitating the movement of barges carrying up to 1500 tons. All necessary structural and technical improvements were made in order to achieve this objective.



9 The *Newscarrier*, a motorized or gasoline-powered barge at lock No. 1 in the Chambly basin in 1943. Although gasoline barges came into existence just after World War I, they were not used on the Chambly Canal until 1934. (Paul Cognac Collection, Chambly.)

The Chambly Canal did not undergo any such modernization, but by reason of the use that was made of it, it became *ipso facto* a barge canal, particularly in the 20th century. In and of themselves, the American barges using it represented more than 75 per cent of the traffic recorded on it. As early as 1913 it was estimated that about half of the vessels passing through the Chambly Canal belonged to the Lake Champlain Transportation Company.[14] Other American carriers were also involved, among which were the Champlain Barge Canal Company, the Lake Champlain Towing Company, the Whitehall and St. Johns Towing Company and, in the 1930s, the Lake Champlain Despatch Company and especially the Murray Transportation Company.

The Murray Transportation Company was particularly active on the Chambly Canal. The entire population along the canal and on the shores of the Richelieu was well acquainted with the Murray barges, which constituted a great flotilla specializing in the shipment of newsprint. With its own tugboats, this firm took its barges to Donnacona and Trois-Rivières, where it had them loaded with 350 or more tons of newsprint in



10 Two linked American barges (barge train). (Drawing and notes by Captain Frank H. Godfrey.)

rolls. This cargo was then shipped via the Chambly Canal to New York and New Jersey. On the return voyage, the barges carried coal and various other cargoes that were mainly destined for Montreal.[15]

On the Canadian side, mention has been made of the Ottawa River companies specializing in shipping timber. The Ottawa and Rideau Forwarding Company, long the major Canadian firm on the Ottawa-Whitehall route, was dethroned toward the end of the 19th century by the George A. Harris Company, an Ottawa-based firm which specialized in carrying lumber to Burlington. It had its own barges and tugs.[16]

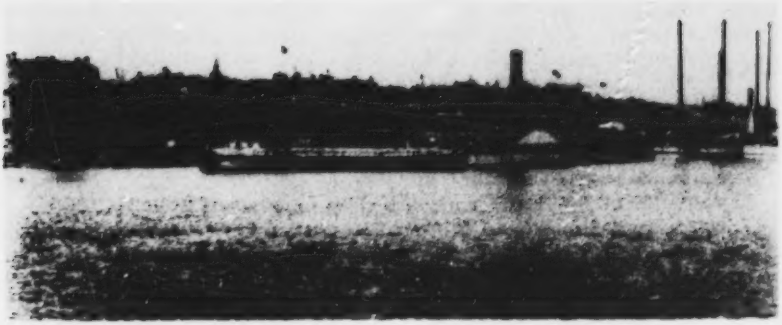
While it can be argued that the canals contributed to the development of the barges, the fact that barges were used in the first place can be attributed to the sizable timber trade between Canada and the United States. This is true at any rate with respect to Canada, where the Ottawa Valley lumbermen began in 1843 to use this mode of transport for shipping their products south of the border. By its very shape, the barge was well-suited - indeed, better suited than any other vessel - to shipping wood in all its forms.

While wood popularized the use of the barge, this was clearly unintentional; the product had not been chosen but had rather imposed itself for a very long time in international trade. To be sure, the interplay of supply and demand changed the respective roles of the trading partners toward the middle of the 19th century, but this did not alter the route by which trade was conducted, and the Richelieu, until the end of its use for trade purposes, remained the route for shipping wood and its by-products.

By way of illustration, in the 20th century the volume of shipping via the Chambly Canal reached its zenith between 1909 and 1912. In 1912 a total volume of 618 415 tons of merchandise was shipped. Pulpwood accounted for 258 268 tons, while lumber accounted for 164 862 tons. Taken together, these wood products represented some two-thirds of the total volume of merchandise transported via the canal.[17]

To improve their balance of trade, Americans counted heavily on their exports of coal, another product transported almost exclusively by barge. Over the years coal was second only to wood in terms of volume shipped on the Chambly Canal. In 1912, for example, 119 928 tons of coal were carried over this route.[18] It came mainly from Pennsylvania and was being shipped to Montreal. As a general rule, it was American barges that, on their way back down the Richelieu, carried coal. This procedure is typical: "The first tow of American coal laden barges arrived in Montreal in tow of the tug steamer *John Young*. They will discharge their cargoes of hard coal on the canal basin; after they will be towed light to Ottawa where they load lumber for a return cargo to Lake Champlain."[19]

Not all the coal shipped northward reached Montreal. In Saint-Jean, for example, merchants obtained coal directly from the barges. This was the case with the firms Bissett & Donaghy, Simard et Godin, and James O'Cain which, in the years from 1880 to 1900, supplied coal



11 Sailing barges moored at the wharf of Saint-Jean coal merchant John Donaghy in 1909. (Public Archives Canada.)

12 The installations of the Chambly Coal Company on the west bank of the canal in 1921. With its own wharf, warehouse and unloading crane, the firm was able to obtain its supplies directly from barges headed for Montreal on their way from Pennsylvania.

for the entire region. To take advantage of the arrivals from the United States, these firms leased wharves in the port, on which they built warehouses.[20] In Chambly the Courtemanche brothers did the same; in 1885 they even obtained permission to erect a platform-mounted crane on the edge of the canal to facilitate the unloading of the coal barges.[21]

While wood and coal were almost strictly transit commodities and thus contributed relatively little to the local or regional economy, this was not the case with hay. The Richelieu valley, having tried in vain between 1760 and 1850 to develop its farming economy on the basis of wheat and then potatoes and oats, finally found its calling in the 1860s in the form of hay. Gradually all the parishes in the region turned to the cultivation of this crop, which reached its apogee between 1900 and 1911 with an annual production of some 300 000 tons.

Virtually from the outset there was an American market for this commodity, and it was soon being shipped to the United States. Once again, the barge proved to be ideal. In 1903, hay exports reached their peak; 30 000 tons, or about one-tenth of the total hay production in the region, went through the locks that year en route to Lake Champlain. This traffic continued until about 1930 although the volume dropped off steeply: 15 000 tons in 1912, 12 000 in 1927 and only 3600 in 1929. The era of hay had ended.[22]

At the outset, during the 1860s, this trade was organized by the agents of specialized American companies, who travelled throughout the Richelieu parishes and directly purchased from farmers enough compressed hay to fill a barge, but by the turn of the century, several companies found it more profitable to open business offices in Saint-Jean and maintain a purchaser-exporter throughout the season. By far the most active were the American Hay Company and the Lydia Egyptian Compress Company, which in 1900 changed its name to the Canadian Bailing Company. During the same period, several French Canadians in and around Saint-Jean founded the Saint-Johns Hay Compress Company, a firm specializing in the steam compression of hay.[23]

Barges were also used for shipping various other products through the Chambly Canal. All these products were of only very secondary importance in terms of the volume that they represented. Iron, copper, clay and sand thus descended the canal over fairly long periods. Canadians in turn used the barges to send to the United States shipments of grain, flour, horses, and even, in the 19th century, ice and eels. Eels came from Ile d'Orléans, and in the fall two barges fitted out as large fish tanks carried them "between waters" to their destination in New York.[24]

Steamboats

While the Chambly Canal, like the Erie and Champlain canals, very early became essentially a barge canal, this was not a development carefully nurtured over time, nor was it even the result of the well-considered decisions of any planning or redevelopment committee. The fact was that from the time it was opened in 1843, the Chambly Canal was incapable of accommodating a type of vessel that had already been in service in North America for 20 years, the steamboat. Only the oldest and smallest such vessels were within any size to enter it.

To be sure, the Erie and Champlain canals were faced with the same problem; however, it must be admitted that at the time of their construction, just after the War of 1812, it was almost impossible to foresee the magnitude of the future development of steam-powered navigation and the impact that this revolution would have on canals. But the Americans, thanks no doubt to their vast resources, attacked this unfavourable situation. In the middle of the 19th century, they enlarged their canals and locks, and when these measures proved insufficient, they advanced a revolutionary concept: limiting inland water transport to specially designed barges and redeveloping their canals for this purpose. They implemented this concept at the end of the 19th century.

The Chambly Canal was designed in the late 1820s and early 1830s. The engineers involved in the project did not take account of the coming of the steamboats, yet the latter were increasing in size and number, both on the St. Lawrence and Lake Champlain. In addition, as a sign of the times, Saint-Jean had been linked by steamboat service to Burlington and Whitehall since 1809. That year, the *Vermont*, owned by John Winans, had undertaken to transport passengers and freight between these centres.[1] In the years that followed, the link was served by the steamships *Phoenix*, *Champlain* and *Congress*, owned by the Lake Champlain Steamboat Company. In 1826 the Champlain Transportation Company began operating on the same route and soon its steamboats, such as the *Franklin*, the *Burlington* and the *Saranac*, held a quasi-monopoly on water transport in the region.[2] All this would indicate that in the 1820s and 1830s, paddle-wheelers were a force to be reckoned with on the Richelieu, and since Saint-Jean was one of the gateways to the proposed canal, it is difficult to explain the canal engineers' lack of perspicacity.

The engineers chose to limit the dimensions of the locks on the canal to approximately 120 feet in length by 24 feet in width, with a depth of seven feet on the sills. Was this decision motivated by strategic and defensive considerations? It is true that, at the time, the imperatives of colonial defence still cast a shadow over all matters relating to the development of communication routes, and the excavation of canals

was no exception. But commercial considerations, especially since the opening of the Champlain and Erie canals, were given fully as much weight even in the eyes of the military.

In 1826, for example, Colonel John By submitted to General Mann his report on the military defence of Canada. His conclusions are particularly significant. He proposed that steam navigation be developed on the St. Lawrence and Great Lakes; such an initiative

> would at once deprive the Americans the means of attacking Canada and would make Great Britain mistress of the trade of that vast population on the borders of the Lakes, of which the Americans have lately so much boasted, and to secure this trade have expended immense sums of money in cutting canals.[3]

Turning next to the question of canals, By showed himself to be equally perspicacious:

> All the canals at present projected are on too confined a scale for the increasing trade of Canada; and for military service they ought to be constructed of sufficient size to pass the steam boats best adapted for navigating the Lakes and rivers of America, which boats measure from 110 to 130 feet in length and from 40 to 50 feet in width, drawing 8 feet water when loaded, and are capable of being turned to military purposes without any expense as each boat would carry 700 men with great ease. It is therefore evident that the moment our canals and locks are completed on this scale, we shall not only possess the trade of all that immense population on the borders of the Lakes, but also have military possession of the Lakes.[4]

By also extended this two-pronged strategy to the Richelieu-Lake Champlain region:

> The number of these steam boats now building on the banks of the St. Lawrence is one of the great proofs of the increasing trade and prosperity of the country. By opening the Richelieu river to admit the steam boats entering Lake Champlain would be the means of making the River St. Lawrence the great outlet for all the produce of that vast tract of land.... and a moment's reflection is sufficient for a military man to understand the vast importance of connecting Lake Champlain with the River St. Lawrence by an uninterrupted steam boat navigation, and it is evident that this would be the most economical mode of defence that can be adopted.[5]

The colonel ended with this quasi-prophetic warning:

> Locks and canals capable of passing the large size steam boats will not be more than sufficient for the growing trade of Canada; and it would be a constant source of regret to construct works too small to pass the vessels best adapted to the navigation and defence of the Lakes.[6]

These views were expressed in 1826, even before the appointment of commissioners to look into the canalization of the Richelieu. Why did the commissioners not adopt the ideas put forward by Colonel By, or at least give consideration to the fact that ever larger steamboats were being built? Were their reasons political, military or financial? It can only be noted that already in 1826, locks of 120 feet by 24 feet with a depth of six or seven feet were considered thoroughly inadequate. In any event, the Chambly Canal would have to make do with its limited dimensions.

It was in 1821 that steamboats first began ascending the lower Richelieu. On 3 August of that year, the *De Salaberry*, fresh from the shipyards of Laprairie, began service between Quebec City and Chambly, with stops at Trois-Rivières, Sorel, Saint-Ours, Saint-Denis, Saint-Antoine, Saint-Marc, Beloeil and Saint-Mathias. Measuring 108 feet by 23, it was the property of some 40 businessmen from Quebec City, Laprairie and the lower Richelieu, including Samuel Hatt, Augustus Kuper, William Yule, Timothée Franchère, Eustache Soupras, Louis Marchand and Augustin Cartier, whose names would soon be largely associated with the Chambly Canal project.

The merchant Augustus Kuper had put the wharf that he owned at Chambly at the disposal of the steamboat, which transported cargo and passengers once a week. With a draught of scarcely three feet, the *De Salaberry* was on several occasions unable to go further upriver than Saint-Ours because of dangerously low water levels on the Richelieu. In July 1823 the vessel caught fire and sank in the St. Lawrence.[7]

The *Laprairie*, which belonged to John Goudie of Quebec City, took its place but soon abandoned this route, subsequently limiting its activities to the St. Lawrence. In the fall of 1823 the St. Lawrence Steam Boat Company, owned by the Molsons of Montreal, decided to establish a line of small, shallow-draught steamboats to operate on the Richelieu. In association with Richelieu merchants Augustus Kuper and Samuel Hatt, it launched the *Chambly* in 1824. With a draught of 22 inches, it provided weekly service between Quebec City, Montreal and Chambly.[8]

Until the early 1840s other steamships plied the Richelieu on a fairly regular basis: the *Edmund Henry* (with the *Malvina*, its own barge, in tow), the *Richelieu*, the *Union Canadienne*, the *Sources de Varennes* and several other, lesser known vessels. Most of these vessels had rather brief careers, sometimes lasting only a few months. Fires and collisions were not uncommon occurrences at the time. Other steamers discon-

tinued service on the Richelieu after little time, finding navigation hazardous - particularly for the larger, less manoeuvrable vessels.

The opening of the Chambly Canal in 1843, followed six years later by the opening of the Saint-Ours lock, definitely gave new life to initiatives in the area of steam navigation on the Richelieu. The commercial boom produced by the excavation of this navigable waterway has already been described; the lively timber trade between the Ottawa valley and Lake Champlain underwent a remarkable expansion at that time, and barges and rafts pulled by steam-powered tugboats often caused serious traffic jams at the canal entrances.

In addition to these small steamboats which were used for towing and belonged to the Ottawa valley or American companies mentioned earlier, vessels belonging to other navigation companies also plied the Richelieu, particularly in the 19th century. Perhaps the most interesting such company was the Compagnie du Richelieu. Composed of 35 shareholders, the principal one being a Sorel businessman named Jacques-Félix Sincennes, the company was set up to deal in passenger service, shipping of first class freight, and towing between Montreal and Lake Champlain.

In October 1845 the company took delivery of the steamboat *Richelieu* and the barge *Sincennes*, and began providing service between Montreal and Chambly. Twice a week the steamer and its barge carried passengers as well as cargoes of farm products, manufactured goods and livestock. "We stopped at Chambly for an afternoon to enable the passengers to visit the old fort, and on Sunday we docked at Saint-Antoine or Saint-Ours so that they could go to Mass." [Translation.][9]

In 1848 the Compagnie du Richelieu merged with a younger rival, the Société de Navigation du Saint-Laurent et du Richelieu, which had been operating the steamer *Jacques Cartier* since the preceding year. But competition remained lively on both the St. Lawrence and the Richelieu. In addition to the sloops and schooners, other steamboats were vying for trade on the Richelieu, including those belonging to Sorel businessman Augustin Saint-Louis, the *Vulcan*, the *Oregon* and the *Saint-Louis*. Specializing in timber transport, Saint-Louis posed a serious threat to the Sincennes group. Thus in 1850 the Compagnie du Richelieu brought out its rival and thereby expanded its fleet.[10]

Between 1850 and 1854, the volume of shipping on the Richelieu dropped off considerably. Whereas from 1848 to 1849 the volume of merchandise shipped through the canal had risen from 18 835 tons to 77 216 tons and the number of vessels had increased by nearly 600 per cent, both these indicators showed increasingly sharp declines beginning in 1850 and continuing for the next four years. In 1852 the volume of goods shipped fell 20 per cent over the preceding year; at the same time, total vessel tonnage stood at only 82 618 tons, whereas it had reached 143 194 tons in 1850. The figures for 1854 indicated a further decrease in relation to 1853: goods shipped dropped by 27.6 per cent and the capacity or tonnage of vessels using the canal tumbled by 34.6 per cent.[11]

The collapse of the shipping industry on the Richelieu was in contrast to the slow but steady growth experienced on other navigable waterways. The Compagnie du Richelieu, which was vying with its competitors for an ever-declining volume of trade, considered pulling out of the Richelieu altogether. "Steamboat transportation on this river, which had formerly been very considerable, had decreased to the point that by the end of the 1853 shipping season it was no longer profitable to serve the Richelieu by steamer." [Translation.][12]

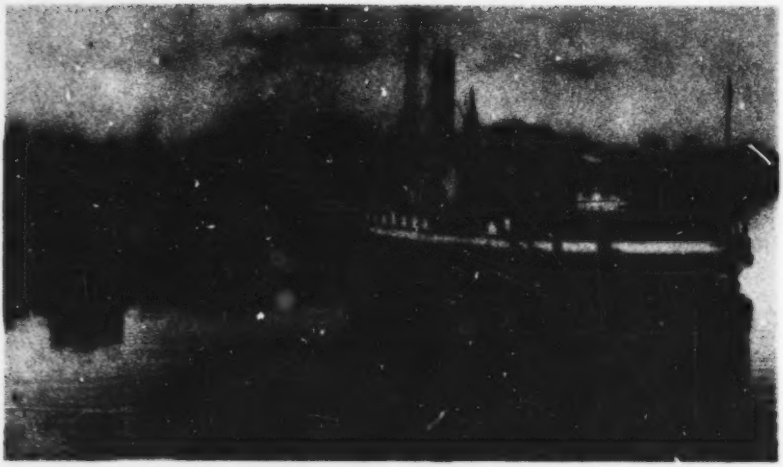
The company thus withdrew to the St. Lawrence, where for about three years it competed fairly successfully with the large companies owned by the Molson, Torrance and Tate groups. In 1856, however, the Compagnie du Richelieu merged with the Ontario Navigation Company to become the Richelieu and Ontario Navigation Company, one of whose priorities was to link the Ottawa and Richelieu rivers. Steamboats would once again be headed for Chambly.[13]

The Richelieu and Ontario Navigation Company, which in 1913 was to give birth to the famous Canada Steamship Lines, had vast financial means at its disposal. It very quickly increased the number of routes on which it operated, and by 1891 it was serving Toronto, Kingston, Montreal, Quebec City and the Saguenay, deploying a fleet of 20 steamboats.[14] For its part, the Richelieu River was made the route of the *Chambly* in the early years of the company's existence. With its captain, François Lamoureux, the steamboat entered into the local folklore, tirelessly providing service between Montreal and Chambly until the turn of the century. Its dimensions prevented it from using the canal.

At Chambly, canal authorities reserved their wharf for companies whose vessels used the canal.[15] Thus, once the *Chambly* was brought into service, its owners built their own wharf there. Twice a week, on Tuesdays and Fridays, Captain Lamoureux left Montreal for Chambly, stopping en route at Lanoraie where the train for Juliette awaited him. On Wednesdays and Saturdays, he headed back from Chambly with freight and passengers.[16]

Over the years, the *Chambly* and its captain acquired a solid reputation for competence, reliability and courtesy. The government commissioned the vessel to carry mail, and the canal authorities often turned to Lamoureux for assistance in disputes regarding the navigability of the river or even accidents occurring on it. Considered primarily a passenger vessel, the *Chambly*, thanks to the mail it carried, was given absolute priority of passage when it presented itself at the Saint-Ours lock.[17]

But the *Chambly* was also a cargo ship, and the cargo it carried was noteworthy for both its size and variety. The Chambly Canal Register shows that between 1859 and 1868, Captain Lamoureux carried mainly flour, oats, sugar, peas, apples, whisky and iron bars. He also frequently carried livestock, including horses, as well as fish, tobacco and cement. The *Chambly* even carried furniture and stoves.[18] It is not difficult to understand why the canal personnel at Chambly referred to it



13 The paddle-wheeler *Chambly* berthed at its wharf on the Chambly basin, August 1894. Owned by the Richelieu and Ontario Navigation Company, this vessel, which at the time was commanded by Captain François Lamoureux, travelled between Montreal and Chambly, but was too large to use the Chambly Canal. (Public Archives Canada.)

as a "market steamer."[19] Toward 1890, Captain Lamoureux retired and was replaced at the helm of the *Chambly* by Captain Jean Chapdelaine.

The Richelieu and Ontario Navigation Company went no further upriver than Chambly, and increasingly, particularly after the 1870s, companies engaged in general transport - in other words, the conveyance of freight and passengers - were to do the same. Thus the Chambly Canal, which at the outset had been seen as a navigable link between the upper and lower Richelieu, necessarily allowing the passage of vessels of all kinds, had in a sense become a corridor for the movement of merchandise, at either end of which gathered shippers and merchants. But was this not merely proof that the Chambly Canal had metamorphosed into a barge canal?

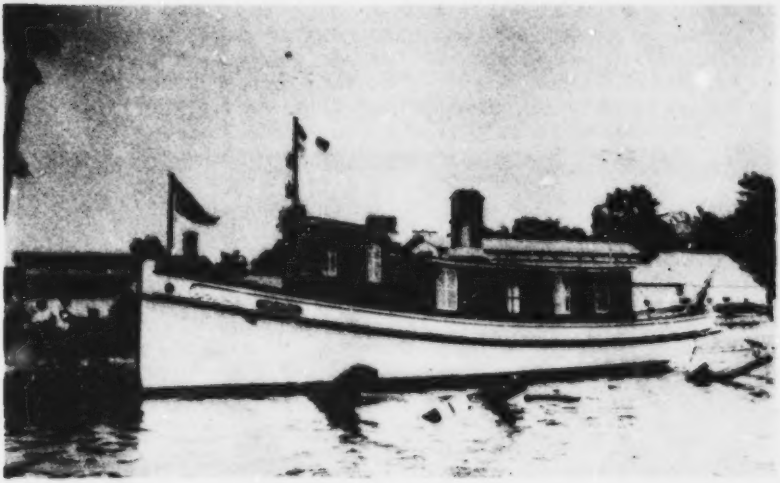
Endowed with an excellent towpath - by far the best on the continent according to the Americans[20] - the Chambly Canal was perfectly suited to barge transport, and, increasingly, steam-powered tugs were content to present themselves at one end of the canal, drop off the train of barges they had brought to that point, and take on another just emerged from the locks. During the 1880s this practice became a general one: whether they belonged to Lake Champlain Transportation, Lake Champlain Towing, Champlain Barge Canal, or Whitehall and St. Johns Towing, American tugs ceased to go farther

14 Pulpwood barges and small steamers moored to the canal wharf at Chambly toward the end of the 19th century. Often the congestion at the entrances to the canal was so great that it produced severe bottlenecks. (Armand Auclair Collection, Chambly.)

downstream than Saint-Jean. Similarly, those belonging to firms operating on the Ottawa or St. Lawrence rivers no longer went farther upstream than Chambly.

Thus, despite the canal, the upper and lower Richelieu were much less closely linked than one might have thought. It was for this reason that in the spring of 1910, Saint-Jean was in a state of near jubilation, the local businessmen having finally persuaded a steam navigation company to provide service between Saint-Jean and Montreal during the summer. This route was to be served by the steamer *Florida*, belonging to the Compagnie de Navigation du Canada, of which Louis Lacouture of Sorel was the manager. "This steamship service will be highly beneficial for our businessmen, who will be enabled to ship their goods to the metropolis much more economically during the summer months. The vessel will set out from Montreal on Wednesday mornings and from Saint-Jean on Friday afternoons." [Translation.][21]

With a canal system on the Richelieu, one would nevertheless have expected such service to have been in operation very early, and,



15 The steam tug *Chambly* at its launching on the canal in 1929. (Public Archives Canada.)

moreover, on a permanent and regular basis. But at least in the 19th century, the businessmen of Saint-Jean seemed closer to their American counterparts; the venerable Whitehall - Saint-Jean route continued to absorb all their energies and resources. In 1883, at a time when Saint-Jean was not even linked by regular steamship service to Montreal, capitalists of New York and Saint-Jean formed a steamship company to provide service between Whitehall and Saint-Jean, the Compagnie de navigation du Lac Champlain et de la rivière Richelieu.[22]

Despite traditional trading patterns and business ties, the fact remains that relatively few steamboats used the Chambly Canal, with the obvious exception of small tugs and the motorized barges that came later, because the canal was not suited to this type of navigation. Companies that were determined to use the canal found that they had either to procure a small vessel suited to the dimensions of the locks (as was the case with the *Florida*) or to have such vessels custom-built, as did the Compagnie de navigation du Lac Champlain et de la rivière Richelieu. The inconvenience involved tended to be a determining factor.

In general, steamboats were disinclined to venture onto the Richelieu. Between Sorel and Chambly, particularly if one had to dock at the wharves of certain communities along the way, the risk of running

16 A passenger steamer at the Sainte-Anne lock, 1926. Because of their small dimensions, such vessels were able to use canal locks both at Chambly and on the Ottawa River. (Public Archives Canada.)

aground was sizable, especially in time of low water levels. The same dangers were present between Saint-Jean and Lake Champlain: "The water is very low on our river, and the large tugs of the compagnie du lac Champlain cannot reach Saint-Jean" [translation].[23] In both the 19th and 20th centuries, steamship captains were forever deploring the poor navigability of the Richelieu over almost all of its course. There was a continual flow of petitions, complaints and requests for dredging to the canal's headquarters.[24]

While dredging was carried out on the Richelieu almost continually during the navigation season - that is, from April to December - it was also conducted in the canal, at least after 1870. Until then, the dredges had been too wide to pass through the locks. In 1864, for example, a canal dredging project had to be called off: "I supposed the dredge was only 22'6" in width, but find from the captain's report that she is 24'6", which, I am sorry to say, is 1'6" too wide for the Locks on the Canal. The project must therefore be abandoned."[25] The purpose of this project had been to deepen the canal to accommodate steamboats.

During the 1867 low-water season, dredging the canal again became a necessity. The dredge then in use in the Lachine Canal was rushed down. It was too wide by about two feet but was quickly altered for use on the Chambly Canal.[26] All this illustrates why only the smallest steamboats were at all disposed toward the Richelieu and its canal.

By the eve of the Second World War, traffic on the Chambly Canal was only a shadow of what it had been earlier. The *Canadien-Francais*, a Saint-Jean newspaper, explained this decline:

> Trade patterns have changed. Increasingly, rapid service is required. Understandably, there is little enthusiasm for barges towed by horses or caterpillar tractors. And the ever-increasing competition forces a continuous reduction of charges. For all these reasons, to say nothing of the impact of customs rates, traffic on the Richelieu has fallen off year after year. [Translation.][27]

In another issue, the subject is dealt with further:

> It is true that exports of timber and hay, like coal imports, have decreased, but they have done so for different reasons: first, the obsolescence of the Chambly Canal, resulting in a considerable increase in shipping costs; second, the almost prohibitive customs rates in effect between the two countries; the third, the Depression. [Translation.][28]

Examination of the figures relating to this traffic shows that it reached its peak in 1909. The period between the two wars, marked by the Depression, saw a spectacular decline, with a certain recovery commencing in 1936. From the end of the Second World War until at

least 1960, commercial traffic on the canal remained strangely stable, although at a low level of activity.[29]

Table 5. Chambly Canal: Number of Vessels Locked and Tonnage of Merchandise Shipped, 1900-60

Year	Number of Vessels	Tons
1900	378	31 000
1904	1241	116 000
1906	3618	238 000
1909	4459	294 000
1920	1542	101 000
1928	743	49 000
1933	75	4 950
1936	275	17 500
1948	605	94 000
1950	692	104 000
1952	614	89 000
1954	709	111 000
1956	708	101 000
1958	688	108 000
1960	796	124 000

In 1950 the main types of goods shipped were:[30]

Fertilizer	(Domestic)	55 578	tons
Newsprint	(Export)	27 756	tons
Sand and gravel	(Import)	225	tons
Cement and bricks	(Import)	200	tons
Oil and petroleum	(Domestic)	84	tons
Fish	(Export)	30	tons

Ten years later, in 1960, the main goods were:[31]

Fertilizer	(Domestic)	46 475	tons
Newsprint	(Export)	27 814	tons
Coal	(Import)	11 233	tons
Explosives	(Domestic)	7 245	tons
Soda	(Domestic)	4 650	tons
Sulphur	(Domestic)	2 400	tons
Clay	(Import)	1 610	tons

Between 1950 and 1960, some 700 vessels passed through the Chambly Canal annually, transporting approximately 100 000 tons of merchandise. Together, fertilizer and newsprint accounted for more than 75 per cent of this tonnage. These figures, which held fairly constant throughout the decade, nevertheless point to a substantial decline in the commercial use of the canal. Prior to 1914, nearly 4500 passages through the canal were recorded each year; in 1960, if some hundred passages by pleasure craft is excluded, the number had fallen to scarcely 700, a reduction of approximately 85 per cent.

Clearly it was the Americans who contributed most heavily to this decline. In 1913, at the height of the canal's commercial use, it was the American vessels that had kept the canal in operation. The Lake Champlain Transportation Company alone owned or controlled more than half of the vessels using the waterway at that time.[32] In contrast, in 1950 only 19 of the 692 passages recorded were attributed to American vessels.[33]

It was between 1961 and 1970 that trade on the canal actually began to die. Until 1965 the number of passages per year remained above 600, a level roughly comparable with that of the postwar years. But in 1966, traffic began to fall off sharply. That year there were only 314 passages; in 1968 there were 288, and in 1970, 184. During the same decade, the tonnage of goods shipped naturally followed the same slope:

1961	94 529	tons
1966	28 649	tons
1970	12 797	tons

Freight transported in 1970 was limited to three goods: 8534 tons of newsprint, 4238 tons of explosives and 25 tons of containers.[34]

It was in 1973 that the Chambly Canal saw its last barge. Trade officially gave way to leisure, and the barge made way for the pleasure craft.

Conclusion

Any judgement made regarding a human undertaking is almost inevitably tinged with subjectivity, and unanimity of viewpoint is rare. The question of the commercial usefulness of the Chambly Canal is no exception to the rule. Throughout its history, the canal was the object of praise and criticism. Both the former and the latter were formulated at specific periods; moreover, they came from persons whose viewpoints and interests were often divergent. While nonexhaustive, this study would appear to be the first not only to examine the commercial contribution of the Chambly Canal, but also to do so from a certain distance, placing the subject in a historical framework. This is reflected in the conclusions that have been drawn.

Particularly on the international scene, the Chambly Canal played a major commercial role, as the statistics clearly show. For more than a century it was one of the mainstays of the export of Canadian forest products to the United States, a claim to fame that no one would deny. A number of other goods benefited from its presence in crossing the 45th parallel in either direction or, more locally, in reaching the upper or lower Richelieu.

Yet the fact remains that this performance fell far short of the immense potential that the canal seemed to offer, which explains the very large measure of frustration evident in the criticisms. It could, of course, be argued that any such shortfall is attributable first to the past exaggeration of the commercial potential of the Richelieu-Hudson route and second to the numerous political and economical setbacks that marked the history of this international corridor. While these arguments are not without merit, it must nevertheless be recognized that the Chambly Canal had scarcely been opened when it began to be seen by its clientele as a deplorable bottleneck.

This was really the heart of the problem. Not only was the Chambly Canal confronted in 1843 with formidable commercial and technological competition, but it also had to meet these challenges with outmoded means. Despite various prophetic warnings, such as by Colonel John By in 1826, the canal was equipped with locks whose dimensions, barely acceptable in terms of the second phase of canalization (1815-40), now constituted a major obstacle to inland commercial navigation, particularly in light of the wide use of ever-larger steamboats and other vessels.

This problem of obsolescence and modernization was of course faced by most Canadian and American canals. But with regard to the Chambly Canal, it is astonishing to note that after a century of history, nothing changed; the dimensions of the locks remained the same, with the result that in 1960, the canal was still considered by the Americans

17 Waterside stable at the lower entrance to the canal on the Chambly basin in 1911. Horses were used to tow nonmotorized vessels through the Chambly Canal throughout almost the entire period of its use.

as being "the limiting link of the system."[1] Why did the Canadian government never intervene to enlarge the Chambly Canal?

Apart from the perennial financial problems, the effects of which should not be underestimated, the reason for this inertia would seem to lie in the government's chronic lack of interest in the Chambly Canal. In the first place, the canalization of the St. Lawrence understandably constituted a much more important priority, particularly after the Act of Union of 1840. Additionally, from 1850 until the beginning of the 20th century, businessmen and politicians turned their backs on the Chambly Canal and gave their attention to various proposals for a direct link between the Montreal area and Lake Champlain. The main routes they considered involved a terminus at Beauharnois, Longueuil or Caughnawaga, rather than Sorel.

The delays caused by these abortive plans were extended by the 1914-18 war and the Great Depression. To be sure, agreement was reached in the meantime to give the Richelieu-Hudson route a depth of 12 feet, but the Chambly Canal was to be only the final stage of this project. And once again, time ran out on it.

But behind what it is tempting to call government negligence regarding Chambly is another factor. The Chambly Canal, despite its restrictive aspects, was functioning rather well. Since the completion of the Saint-Ours lock in 1849, shipping on the Richelieu had developed a *modus operandi* that was fairly effective under the circumstances. After all, the main purpose of the Chambly Canal from its earliest days onward was to enable forest products to be shipped to the United States. For this purpose it was not necessary for steamers to be able to move through the canal, but since they were very frequently used to tow

barges or lumber rafts, they did have to be able to reach the Chambly basin, at the lower entrance to the canal. This they were able to do without difficulty, thanks to the Saint-Ours lock. An excellent towing system employing horses was then used to take the barges and rafts to Saint-Jean, where they were once again taken in tow by steamboats. In short, the Chambly Canal was able to perform its function provided that the larger vessels were capable of reaching its entrance.

It would appear that the Canadian government, unlike its American counterpart, settled fairly early for this level of performance, taking account of its needs on the Richelieu, its priorities on the St. Lawrence and elsewhere, and its budgetary constraints. What are we to think of this ordering of priorities? It is clearly viewed with approval by historian Fernand Ouellet, who criticizes the House of Assembly of Lower Canada for having taken an interest in 1821-22 in the construction of the Chambly Canal, "a minor project, a local undertaking of no great consequence" [translation].[2]

Appendix A. Total Movement of Goods on the Welland, St. Lawrence and Chambly Canals, 1848, 1849 and 1850.[1]

	WELLAND.			ST. LAWRENCE.			CHAMBLY.		
	1848.	1849.	1850.	1848.	1849.	1850.	1848.	1849.	1850.
FOREST	69,993	78,856	107,235	69,351	70,310	124,9[illegible]	16,864	61,194	79,1[illegible]
VEGETABLE FOOD	126,[illegible]	141,804	145,709	81,[illegible]	69,501	89,[illegible]	49	7,889	81,1[illegible]
FARM STOCK	43	24[illegible]	.....	87[illegible]	822	1,[illegible]	.....	12	[illegible]
OTHER AGRICULTURAL PRODUCE	11,[illegible]	17,[illegible]	13,105	5,[illegible]	4,215	9,[illegible]	26	64	[illegible]
MANUFACTURES	69,[illegible]	78,[illegible]	89,080	(1) 3,000	(1) 31,047	49,[illegible]	889	1,[illegible]	3,877
MERCHANDISE, &c.	45,[illegible]	49,[illegible]	84,541	(1) 4,[illegible]	(1) 17,847	34,[illegible]	13,[illegible]	6,764	4,[illegible]
TOTAL TONS	327,[illegible]	351,[illegible]	389,669	164,367	213,153	332,[illegible]	16,[illegible]	77,[illegible]	[illegible]
PASSENGERS ..... Number.	2,487	1,640	1,388	21,071	26,897	25,[illegible]	470	8,440	870
BOATS OF ALL KINDS ..... "	2,[illegible]	2,[illegible]	4,761	5,440	5,440	5,[illegible]	660	1,[illegible]	2,[illegible]
TOTAL TONNAGE OF VESSELS ..(Tonnage)	272,[illegible]	466,[illegible]	507,[illegible]	476,[illegible]	444,[illegible]	460,[illegible]	32,[illegible]	182,[illegible]	142,[illegible]

(1) The large increase in 1849 is accounted for, by the Act 12 Vic. Cap. 4, imposing a Toll on the Traffic passing outside of the Canal.

Appendix B. Quantity of Each Article Transported on the Chambly Canal, 1850.[1]

ARTICLES.	TOTAL TONS.	From British to British Ports.		From British to Foreign Ports.		From Foreign to British Ports.		From Foreign to Foreign Ports.		TOTALS.		AMOUNT OF TOLLS.
		Up.	Down.	Up.	Down.	Up.	Down.	Up.	Down.	Up	Down.	£ s. d.
Ashes	243½			235½				7½		243½		8 1 7½
Apples and Potatoes	412	6½	76	40			289½			35½	381½	9 7 8
Butter	2½			2						2½		0 2 7½
Bacon and Hams	2			2						2		0 1 4½
Buck-Wheat and Peas	302	179½		127						306		0 16 9½
Cheese	0½						0½				0½	0 0 7
Cattle	0½						0½				0½	0 0 3
Cider	23½						23½				23½	1 4 11½
Flax and Grass Seed	66	3		63						66		1 12 1
Flour	7,795½	9½	31	7,754½			2		30½	7,787½	30	280 14 9½
Gypsum	4			4						4		0 2 0
Hides	106½						99½				106½	3 6 7
Horns	2			2						2		0 1 0
Indian Corn	233			233						233		5 16 6
Oats and Barley	6,720½	380½	456½	5,862½						6,243	456½	151 6 5
Pork and Beef	220½		0½	75½			363½			75½	364	13 6 5½
Tallow	74½		19				55½				74½	2 0 10
Tobacco	97						97				97	3 0 7
Wheat	5,659½	341½	445½	4,872½						5,214	445½	195 0 10
Coal	1,052½	170	8	714			114½			884	168½	33 10 7
Glass and Stone-ware, &c.	30½	1	23½				6			1	29½	0 16 7½
Bar Iron	119		32	5			9	83		88	31	3 13 9
Pig and Scrap Iron	167½			5			162½			5	162½	4 3 10½
Castings and Hardware	598	0½	23½	3½	30		415½		54½	4	593	19 3 9½
Locomotives, Rail Road Trucks, Cars, &c.	195½	0½	0½				99	34		34½	68½	4 6 5½
Mechanics Tools	0½						0½				0½	0 0 2½
Marble, Slate, Clay, Stone and Brick	639½	189½	29	5½			425½			189	451½	13 4 5½
Salt	2,634½	1,099½		1,535			0½			2,634½	0½	84 11 5½
Coffee	7						7				7	0 3 6
Fish	85			84			1			84	1	3 3 10
Furniture and Baggage	40½	13	17½	3			14½		13	15	32½	1 9 9½
Rags	44	16½		28½						44		1 7 6½
Calcareous	30½			30½						30½		1 2 7½
Sugar and Molasses	274½		13½				261				274½	13 4 3½
Vinegar	4½						4½				4½	0 2 4½
Whiskey	8		8								8	0 2 0
Merchandize	2,180	705½	569½	30½			863½	0½		736½	1,433½	53 15 10
TOTALS	35,168½	3,203	1,750½	21,911½	30		3,385	136½	98	24,360½	10,773½	881 4 3½
TIMBER—												
Square Timber in Rafts per M C ft.	1,788½	534		1,128½						1,788½		891 5 1½
Round " " per M L ft.	10			10						10		3 15 0
Boards, Plank, &c., Rafts per M inch measure	94	94								94		2 18 0
Boards, Plank, &c. in Boats per M inch measure	32,933½	720½	4	32,209			11	998½		33,018½	15	792 18 9½
Barrel, Staves per M	194½			194½						194½		8 4 5
Shingles M	632			632						632		3 11 6½
Boat Knees, Tons	5			5						5		0 6 2
Rail Road Sleepers, Tons	50			50						50		3 3 6
Scabs "	10			10						10		0 13 4
Fire Wood, Cords	486	281	77				8			281	85	4 13 5
Empty Barrels, Number	93	10		84						93		0 4 2

Notes

Part One Use of the Richelieu River prior to the Construction of the Chambly Canal, 1603-1843

New France, 1603-1763

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Appendix A. Total Movement of Goods on the Welland, St. Lawrence and Chambly Canals, 1848, 1849 and 1859.

1 Canada (Province). Legislative Assembly, Appendix to the Tenth Volume of the Journals of the Legislative Assembly...., Session 1851, (Quebec: [1851]), Vol. 10, No. 1, App. A, Table No. 11.

Appendix B. Quantity of Each Article Transported on the Chambly Canal, 1850.

1 Canada (Province). Legislative Assembly, Appendix to the Tenth Volume of the Journals of the Legislative Assembly.... Session 1851 (Quebec: [1851]), Vol. 10, No. 1, App. A, Table No. 3.

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